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THE
CYCLOPÆDIA;
OR,
Universal Dictionary
OF
ARTS, SCIENCES, AND LITERATURE.

VOL. XXVIII.

THE HISTORY OF THE

ROYAL SOCIETY OF LONDON

FROM ITS FOUNDATION TO THE PRESENT TIME

THE
CYCLOPÆDIA;

OR,

UNIVERSAL DICTIONARY

OF

Arts, Sciences, and Literature.

BY

ABRAHAM REES, D.D. F.R.S. F.L.S. *S. Amer. Soc.*

WITH THE ASSISTANCE OF

EMINENT PROFESSIONAL GENTLEMEN.

ILLUSTRATED WITH NUMEROUS ENGRAVINGS,

BY THE MOST DISTINGUISHED ARTISTS.

IN THIRTY-NINE VOLUMES.

VOL. XXVIII.

LONDON:

PRINTED FOR LONGMAN, HURST, REES, ORME, & BROWN, PATERNOSTER-ROW,
F.C. AND J. RIVINGTON, A. STRAHAN, PAYNE AND FOSS, SCATCHERD AND LETTERMAN, J. CUTHELL,
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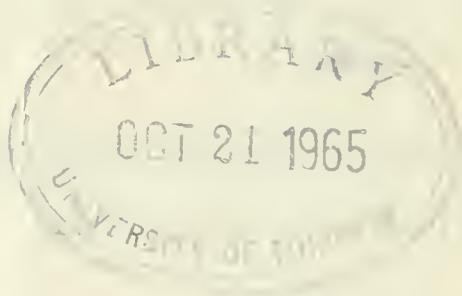
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CYCLOPÆDIA:

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ARTS and SCIENCES.

POETRY.

POETRY, POESY, has been defined by some writers to be the art of composing poems, or pieces in verse. But that this definition does not convey a just idea of the nature and art of poetry will sufficiently appear in the sequel of this article.

The word is formed from the Greek ποιησις, of ποιειν, *facio, I make.*

If a verse be considered as a mere series of just six feet following one after another in the same line, poetry and versification will appear two very different things; but Bossu, in his idea of verse, includes cadences, peculiar constructions, arrangements, and expressions unknown in common discourse; and, above all, a certain noble, bold, elevated, and metaphorical turn and manner of diction. These, he observes, are so essential to poetry, that without them the most exact arrangement of long and short syllables makes little else but a kind of measured prose; whereas these, in a discourse that has no poetical feet or measures, do yet give it the poetical character, and make it a kind of *unmeasured* poetry.

The rules of poetry and versifying are taught by art, and acquired by study; but this force and elevation of thought, which Horace calls *something divine*, and which alone makes the poetry of any value, must be derived from nature; or, according to Aristotle, from some happy transports, to which that author gives the name of madness: Ευφροσύνη ἢ ποικιλία ἐστὶν ἡ μακρολογία. But there must be conceived a just solid judgment, to direct and govern this fury of the poet's imagination.

Hence the critic concludes, that *the end* of poetry is to please; *its cause*, either the excellence of the poet's genius, or a poetical fury, and transport of the soul, manageable by the judgment; *its matter*, long and short syllables, and feet composed of them, with words furnished by grammar;

and *its form*, the arrangement of all these things in just and agreeable verse, expressing the thoughts and sentiments of the author, after the manner already mentioned.

But, after all, how narrow are these bounds, if we consider poetry in the light in which the works of Homer and Virgil have set it? What is here laid down pretends to no praise, which a mere translator may not rise to, and which the war of Cataline might not merit, if turned out of the prose of Sallust. It is with reason, therefore, that we distinguish the *low* and *simple* from the *greater* poetry; by giving the former the title of *versification*; and that we make *poetry* and *versification* two distinct arts: in effect, there is not more difference between grammar and rhetoric, than between the art of making verses, and that of inventing poems.

The *greater* poetry, then, consists principally in fiction, or the invention of fables; in the expressing of things by allegories, and metaphors; and in the inventing of actions, under which the truths which the poet has to teach may be agreeably disguised.

Poetry, says an ingenious writer (see Percival's Essay on the Fine Arts), comprehending under the term all numerous and rhetorical composition, derives most of its charms from allusions, similes, metaphors, or descriptions; and these are obviously imitative. In this way, its powers are so transcendent, that even a single epithet will sometimes produce a representation more picturesque, than the pencil of Poussin or Salvator Rosa ever exhibited. The first line in the following stanza of Gray's elegy, will afford an example, and a proof of what is here advanced.

“ Now fades the *glimmering* landscape on the sight,
And all the air a solemn stillness holds,
Save where the beetle wheels his droning flight,
And drowsy tinklings lull the distant folds.”

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The accuracy and force of the word *glimmering* must be felt by any one who has viewed, with attention, an extensive prospect, about an hour after sun-set.

In this view, scarcely any poems retain the nature and essence of the grand poetry, but the epopœia, tragedy, and comedy; the rest, be they elegies, satires, songs, or what they will, come under the name of versification.

Critics, says Dr. Blair, have differed, and disputed much, concerning the proper definition of poetry. Some have made its essence to consist in fiction, and support their opinion by the authority of Aristotle and Plato. But though fiction may have a great share in many poetical compositions, yet many subjects of poetry may not be feigned; as where the poet describes objects which actually exist, or pours forth the real sentiments of his own heart. Others have made the characteristic of poetry to lie in imitation; but in this respect it does not differ from other arts, which are imitative, as well as poetry; and besides, an imitation of human manners and characters, may be carried on in the humblest prose, no less than in the most lofty poetic strain. The most just and comprehensive definition of poetry, in this author's opinion, is, "that it is the language of passion, or of enlivened imagination, formed, most commonly, into regular numbers." The primary aim of a poet is to please, and to move; and therefore he addresses the imagination and the passions; whereas, the aim of the historian, orator, and philosopher, being to inform, to persuade, or to instruct, they address themselves, for the most part, primarily to the understanding. The poet, however, may and ought to have it in his view, to instruct and reform; but it is indirectly, and by pleasing and moving, that he accomplishes this end. To the same purpose it is observed by the eminently learned and judicious bishop Lowth, that poetry is commonly understood to have two objects in view, namely, advantage and pleasure, or rather an union of both. The learned prelate has thus adopted the sentiment expressed by Horace in the following verse, "aut prodesse volunt, aut delectare poetæ." But he wishes that utility had been proposed as the ultimate object of poetry, and pleasure as the means by which that end may be effectually accomplished. It must be allowed, however, that there are poems which merely delight; the excellence of which is founded upon the same principle with that of a beautiful picture, which is more valued for contributing to pleasure only, than many other things are for their actual utility. The philosopher and the poet, Dr. Lowth observes, seem principally to differ in the means by which they pursue the same end. Each sustains the character of a preceptor, which one supports by teaching with accuracy, with subtlety, and with perspicuity, and the other, with splendour, harmony, and elegance. The one makes his appeal to reason only, independent of the passions; the other addresses the reason in such a manner, as even to engage the passions on his side. The one proceeds to virtue and truth by the nearest and most compendious ways; the other leads to the same point through certain deflexions and deviations, by a winding, but pleasanter, path. It is the part of the former so to describe and explain these objects, that we must necessarily become acquainted with them; it is the part of the latter so to dress and adorn them, that of our own accord we must love and embrace them. Hence the prelate lays down as a fundamental maxim, that poetry is useful, chiefly because it is agreeable; and he concludes, with due respect to philosophy, that the writings of the poet are more useful than those of the philosopher, inasmuch as they are more agreeable. This assertion he vindicates and establishes by a variety of

apposite examples, and he applies it to the different species of poetry.

In heroic poetry, *e. gr.* the poet teaches not by maxims and precepts, and in the dull, sententious form; but by the harmony of verse, by the beauty of imagery, by the ingenuity of the fable, by the exactness of imitation, he allures and interests the mind of the reader, he fashions it to habits of virtue, and in a manner informs it with the spirit of integrity itself. If from the heroic we turn to the tragic muse, to which Aristotle (Poet. cap. ult.) indeed assigns the preference, because of the true and perfect imitation, the superiority of poetry over philosophy may be evinced, on the principle of its being more agreeable. It is allowed, however, that no man ever arrived at the summit of poetic fame, who did not previously lay the foundation of his art in true philosophy, properly and extensively understood.

An agreeable writer, to whose Essays we have already referred, adduces a number of instances, in which ancient and modern poets have deviated widely from nature, by adopting facts and opinions, without examination, or on insufficient authority. Who, for instance, can notice the countenance of an ox, without perceiving that it displays meekness, patience, and the most inoffensive disposition, thus described by Mr. Thomson,

" ————— And the plain ox,
That honest, harmless, guileless animal;"

and that the eyes of this animal are of no unusual dimension. Nevertheless, in many versions of Homer, that divine poet, so conversant with zoology, is made to style the artful, proud, and passionate queen of the gods, "ox-eyed Juno." This mistake of the translator has evidently arisen from the want of attention to nature. And M. Dacier has shewn, that the particle *βε* is only an augmentative signifying (*valde*) large-eyed; and that it has no direct relation to the ox. Dr. Young has also fallen into an error, more pardonable, in his paraphrase on Job; because an English poet, who has never seen the crocodile, might be ignorant that his eyes are remarkably small. If this animal be, as some have supposed, the leviathan, described in the 41st chapter of that book, the following must have a reference to the brightness, and not to the magnitude of his organs of sight, as Mr. Aikin, in his elegant and ingenious essay on the application of natural history to poetry, has judiciously remarked. "By his neefings a light doth shine; and his eyes are like the eye-lids of the morning;" (ch. xli. 18.) Dr. Young, by a misconception of the original, has rendered this strong figure still more hyperbolic.

" Large is his front; and when his burnish'd eyes
Lift their broad lids, the morning seems to rise."

The supposition that the fertilizing quality of snow arises from nitrous salts, which it is supposed to acquire in the act of freezing, is destitute of foundation. False philosophy, says the bishop of Landaff, (Dr. Watson,) in his "Chemical Essays," first gave rise to this idea, and poetry has contributed to diffuse the error. Thus, Mr. Philips:

" ————— O may'st thou often see
Thy furrows whiten'd by the woolly rain,
Nutritious; secret nitre lurks within
The porous wet; quickening the languid glebe."

Hence it may be observed, that whenever philosophy is introduced into poetry, truth, for the most part, is essential to its power of giving pleasure; and it is of great importance that the poet should be directed by just views of the system

of nature. It has been said, however, that it is sufficient, without exactly copying nature, that the productions of the poet be consistent either with general experience, or with popular opinion, or with itself, and connected with probable circumstances. But as nothing unnatural can please, poetry, the aim of which is to give pleasure, and in this way to communicate instruction, ought, as nearly as possible, to conform to nature. This constitutes its distinguishing excellence, as an imitative art. In some cases, however, the poet is allowed, by the aid of fancy, to improve (if the expression may be allowed) and to embellish nature. When gross errors in philosophy, astronomy, or natural history, are introduced into the works of the poet, sanctioned by it, and also diffused by their agreeable and captivating accompaniments, they tend to obstruct one of the principal aims of poetry, and not only to diminish its utility, but to render it instrumental in supporting and disseminating fallacious opinions. Milton, not only in his machinery on many of the various characters he has introduced, has occasionally descended from the almost peerless majesty of his work, by mixing prevalent errors with truth, and the groundless opinions of the ancients with modern discoveries. Thus, when Raphael addresses Adam, concerning the great system of nature, he says,

“ ————— Other suns, perhaps,
With their attendant moons, thou wilt descry,
Communicating *male* and *female* light.”

The idea of *male* light being communicated by the *sun*, and *female* light by the *moon*, probably originated in the mind of Milton, from his intimate acquaintance with the writings of Pliny, who mentions as a tradition (Hist. Nat. lib. ii. cap. 100.) “that the sun is a masculine star, drying all things, but that the moon is a soft and feminine star, of dissolving power; and that thus the balance of nature is preserved; some of the stars binding the elements, and others loosening them.”

The *harmony* of the spheres (see HARMONY, &c.), first taught by the Pythagoreans, is so pleasing to the imagination, that it is not surprising the poets should have adopted it. And Milton has given such a view of it, as wants nothing but philosophical truth to render it delightful.

“ Mystical dance, which yonder starry sphere
Of planets, and of fix'd, in all her wheels
Resembles most; mazes intricate,
Excentric, intervolv'd, yet regular,
Then most, when most irregular they seem;
And in their motions harmony divine,
So smooths her charming tones, that God's own ear
Listens delighted.”

Mr. Pope has not only supposed the actual existence of this heavenly harmony, but that it is possible the human ear might have been so constituted, as to have been sensible of it.

“ If Nature thunder'd in his opening ears,
And stunn'd him with the music of the spheres;
How would he wish that heav'n had left him still,
The whisp'ring zephyr, and the purling rill.”

The system of philosophy, which is now immoveably established on the basis of the discoveries and demonstrations of Copernicus, Kepler, and Newton, independently of its superiority in point of truth, infinitely exceeds in extent, elevation, and grandeur, that of the ancients. The poet should, therefore, be well versed in the science of physics, not only because he can seldom deviate from it, without in-

jury to his compositions, but because these may derive from it sublimity, embellishment, or grace. Astronomy, in particular, furnishes such magnificent ideas and boundless views, that imagination can hardly grasp, much less exalt or amplify them.

A specimen appears in the following lines, with all the charms of grace and harmony.

“ ————— Seiz'd in thought
On fancy's wild and roving wing I fail
From the green borders of the peopled earth
And the pale moon, her duteous fair attendant;
From solitary Mars; from the vast orb
Of Jupiter, whose huge gigantic bulk
Dances in ether, like the lightest leaf:
To the dim verge, the suburbs of the system,
Where cheerless Saturn 'midst his wat'ry moons,
Girt with a lucid zone, majestic sits
In gloomy grandeur, like an exil'd queen
Amongst her weeping handmaids; fearless thence
I launch into the trackless deeps of space,
Where burning round ten thousand suns appear,
Of elder beam; which ask no leave to shine
Of our terrestrial star, nor borrow light
From the proud regent of our scanty day:
Sons of the morning, first born of creation,
And only less than him who marks their track,
And guides their fiery wheels. Here must I stop?
Or is there aught beyond? What hand, unseen,
Impels me onward, through the glowing orbs
Of habitable nature; far remote,
To the dread confines of eternal night,
To solitudes of vast unpeopled space,
The deserts of creation, wide and wild;
Where embryo systems, and unkindled suns,
Sleep in the womb of Chaos! Fancy droops,
And thought, astonish'd, stops her bold career.”

Mrs. Barbauld's Evening Meditation.

Homer's animated picture of a moonlight and starry night transports us, in our imagination and feeling, to the scene which it exhibits. Such is the following passage in his Iliad, l. viii. line 687, translated with singular felicity by Mr. Pope.

“ As when the moon, refulgent lamp of night,
O'er heaven's clear azure spreads her sacred light:
When not a breath disturbs the deep serene,
And not a cloud o'ercasts the solemn scene;
Around her throne the vivid planets roll,
And stars unnumber'd gild the glowing pole:
O'er the dark trees a yellower verdure shed,
And tip with silver every mountain's head;
Then shine the vales, the rocks in prospect rise,
A flood of glory bursts from all the skies:
The conscious swains, rejoicing in the sight,
Eye the blue vault, and bless the useful light.”

The evening scenery is admirably portrayed by Mrs. Barbauld; *ubi supra*:

“ ————— Nature's self is hush'd,
And but a scatter'd leaf which rustles thro'
The thick-wove foliage; not a sound is heard
To break the midnight air.

“ ————— 'Tis now the hour
When contemplation, from her sunless haunts,
Moves forward; and with radiant finger points
Where, one by one, the living eyes of heaven

Awake, quick kindling o'er the face of ether
One boundless blaze; ten thousand trembling fires
And dancing lustres, where th' unsteady eye,
Restless and dazzled, wanders unconfin'd
O'er all this field of glories."

The account which Don Ulloa has given of his station on the top of Cotopaxi, a mountain in Peru, more than three geographical miles above the level of the sea, would have been felt and admirably described by the poet, who furnishes us with the following passage:

"—————When lightning fires
The arch of heaven, and thunders rock the ground;
When furious whirlwinds rend the howling air,
And Ocean, groaning from his lowest bed,
Heaves his tempestuous billows to the sky:
Amid the mighty uproar, while below
The nations tremble, Shakspeare looks abroad
From some high cliff, superior, and enjoys
The elemental war." Akenfide.

The poet, who would excel in description, should also exercise his talents in the judicious selection and picturesque display of small groups, or individual objects; and for this purpose, he should draw forth what is valuable, even from the rudest materials; nearly discriminating, in every surrounding object, those attributes, which can be rendered subservient to his art.

Thomson, it is said, was accustomed to wander whole days and nights in the country; and in such sequestered walks, he acquired, by the most minute attention, a knowledge of all the mysteries of nature. These he has wrought into his "Seasons," with the colouring of Titian, the wildness of Salvator Rosa, and the energy of Raphael. Milton appears to have been no less familiar with nature than Thomson, and equally happy in his portraits of her most pleasing forms. He catches every distinguishing feature; and gives to what he describes such glowing tints of life and reality, that we have it, as it were, in full view before our eyes. How perfect is the image in the following lines!

"———The swan, with arched neck
Between her white wings mantling, proudly rows
Her state, with oary feet."

The examples we have produced evince the importance of the poet's acquiring an extensive acquaintance with science in general, and with the various branches of natural history, that he may not, through mere ignorance, deviate from nature, as it actually exists; nevertheless it is not expected, that, on all occasions, he should be restricted within the precise boundaries of truth, nor indeed is it possible to restrain a poetic writer of lively and creative fancy.

Comparing poetry with history, Dr. Lowth gives the preference to the former. "History," with respect to instruction in morals, "is confined within too narrow limits; it is subject to laws peculiar to itself; it relates things as they really were; it traces events under the guidance of authority; it must exhibit what has happened, not what might or ought to have happened. It must not deviate in quest of reasonable instruction or plausible conjecture, but confine itself to that path, which the stubbornness of fact has prescribed. History treats of things and persons, which have been in actual existence; whereas the subjects of poetry are infinite and universal. The one investigates causes through the uncertain medium of conjecture; the other demonstrates them with clearness and certainty. The

one catches the usual glimpses of truth, whenever they break forth to the view; the other contemplates her unclouded appearance. History pursues her appointed journey by a direct path; poetry ranges uncontrolled over the wide expanse of nature. The former must make her precepts subservient to the subject, the latter forms a subject subordinate to her precepts and designs. For these reasons poetry is defined by Aristotle to be something of a more serious and philosophical nature than history. (Poet. c. 9.)" Bacon (De Augm. Scient. l. ii. 13.) coincides with Aristotle in sentiment, as appears from the following passage. "Since the sensible world is in dignity inferior to the rational soul; poetry seems to endow human nature with that which lies beyond the power of history, and to gratify the mind with at least the shadow of things, where the substance cannot be had. For if the matter be properly considered, an argument may be drawn from poetry, that a superior dignity in things, a more perfect order, and a more beautiful variety delight the soul of man, than are found in nature since the fall. As, therefore, the actions and events, which are the subject of true history, are not of sufficient amplitude to content the mind of man; poetry is at hand, and invents actions of a more heroic nature. Because true history reports the success of events not proportionably to desert, or according to the virtue or vice that has been displayed in them; poetry corrects this, and represents events and fortunes according to justice and merit: because true history, from the obvious similarity of actions, and the satiety which this circumstance must occasion, frequently creates a distaste in the mind; poetry cheers and refreshes it, exhibiting things uncommon, varied, and full of vicissitude. As poetry, therefore, contributes not only to pleasure, but to magnanimity and good morals; it is deservedly supposed to participate in some measure of divine inspiration; since it raises the mind, and fills it with sublime ideas, by proportioning the appearances of things to the desires of the mind; and not submitting the mind to things, like reason and history."

It has been a very prevalent opinion, that the cultivation of poetry has contributed to the improvement of oratory. We may here observe in general, that though the language of poetry differs very widely from that of all other kinds of composition, yet he, who has bestowed some time and attention in the perusal and imitation of the poets, will find his understanding exercised and improved, the vigour and activity of his mind increased, and even his manner of expression to have insensibly acquired a tinge from his elegant intercourse. And it has been suggested, that both Cæsar and Tully (one the most elegant, the other the most eloquent of the Romans) might have derived considerable assistance from the cultivation of this branch of polite literature, since it is well known, that both of them were addicted to the reading of poetry, and even exercised in the composition of it. Accordingly, Quintilian intimates (lib. x. 5.) that Cicero acquired that luminous and splendid diction, which he possessed, by occasionally resorting to such amusing occupations. Others, however, have doubted, whether Cicero was indebted for his excellence as an orator to the cultivation of poetry; and they have observed, that he would have been accounted but as a moderate orator, if his orations had only equalled his poetry, and if he had spoken as he sung:

"Fortune foretun'd the dying notes of Rome:
Till I thy Consul sole, consol'd thy doom."

Although we might not have expected to have found that Cicero rivalled the polish and perfection of Virgil, we might

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might at least have hoped, that his verse would have manifested some traces of that fire and fancy, which appear in his oratory. The case is far otherwise, for he appears not deficient in art, but in nature; in that energy and enthusiasm, which is called the "poetic furor." If indeed poetry serves to form an accomplished orator, we can hardly expect to find the same person excellent in both arts. The language of poetry has something in it so different and contrary to that of oratory, that we seldom find those, who have applied much to the one, rise above mediocrity in the other. The chief excellence of an orator consists in perspicuity, and in such a degree of perspicuity as is necessary to render the composition intelligible even to the common people; but though obscurity be not a necessary adjunct of a good poem, it must be considerably superior to the language and comprehension of the vulgar to rank above mediocrity. The orator must not deviate from the common and beaten track of language; the poet must aim at a happy boldness of diction, and wander into new paths. The orator, in order to be generally understood, is necessarily more copious and prolix, not only than the poet, but than all other writers; the chief commendation of the poet is brevity. A poem is always enervated by circumlocutions, unless new lights of sentiment and language are thrown in. For these and other reasons, says Dr. Lowth, I am of opinion, that if a well-cultivated genius for poetry should apply earnestly to oratory, he might indeed prove such an orator as would please a learned audience, and not be displeasing to the populace; but such a man will never prove a very popular orator, on whom the people shall gaze with admiration and rapture, and who shall acquire a perfect ascendancy over all their passions; and he who is by nature an orator, may possibly be a poet for the multitude, or by art and study, and the imitation of the best models, may make a decent proficiency, but he never can be a great and divine poet.

The writings of Plato, it has been said, indicate his acquaintance with poetry, and hence he is thought not only to have erred in his judgment, but to have acted an ungrateful part, when he excluded from his imaginary commonwealth that art, to which he was so much indebted for the splendour and elegance of his genius, from whose fountains he had derived that soft, copious, and harmonious style, for which he is so justly admired.

The ancient eloquence, it is observed, was full of mysteries and allegories. The truth was by them usually disguised under those ingenious inventions, called *μυθῶν*, *fables*, q. d. *words*; as if there were as much difference between these fabulous discourses of the learned, and the common language, as between the speech peculiar to man and the voice of brutes.

At first fables were chiefly used in treating of the divine nature, after the manner they then conceived of it: this occasioned the first poets to be called *divines*, and poetry the *language of the gods*. The divine attributes they separated into a number of persons; because the weakness of the human mind could not conceive so much power, and so much action, in a simplicity so strict and indivisible as that of God.

Nor could they speak of the operation of this almighty cause, without speaking likewise of its effect. They therefore added physics to their theology, handling both after the same manner, without quitting their veils or allegories.

Now man being the most considerable of all the works of the Deity, and there being nothing so proper for poets, or of such general use to mankind as such a subject, they therefore added ethics to the former, and treated the doctrine

of manners in the same way as they had done divinity and physiology: and hence arose the *epopœia* or epic poem.

The epic poets have done with regard to morality, just the contrary of what the divine poets did for their theology. As the too great diversity of divine actions and perfections, so little proportioned to our understanding, occasioned the latter to divide the single idea of the simple essence of God into several persons under different names, as Jupiter, Juno, Neptune, &c. so, on the contrary, the nature of moral philosophy, which never gives any rules for particular things, occasioned the epic poets to unite in one single idea, in the same person, and even in a single action, whatever of the like kind occurs in different persons and different actions.

Thus, says Aristotle, poetry teaches moral philosophy, not by reciting historically what Alcibiades has done or suffered, but proposing what such a person, whom the poet calls by any name he pleases, would necessarily or probably have done or said on the like occasion. It is in this manner that poetry represents either the unhappy consequences of designs ill concerted, of wicked actions, &c. or the reward of good actions, and pleasure reaped from a design laid in virtue, and conducted by prudence.

Thus, according to our critic, the poetical actions and persons are all feigned, allegorical, and universal, not historical and singular. This is likewise the sentiment of Horace; who adds, that poets teach morality as well as philosophy; but the preference herein he gives to Homer. This advantage of the poets over mere philosophers arises hence, that all poetry is an imitation. Now imitation is a thing extremely natural; and hence this manner of proposing things becomes better fitted to engage the auditors. Again, imitation is an instruction given by examples; and examples are the more proper to persuade, because they prove the thing possible. In effect, imitation is so much the nature of poetry, that, Aristotle tells us, it is to this the art owes its rise.

But the poets, by becoming philosophers, did not cease to be divines; on the contrary, the morality they taught obliged them frequently to introduce the Deity in their works; and the share so august a Being had in the action, obliged the poet to make it grand, important, and conducted by the persons of kings and princes.

Add to this that it likewise obliged the poet to think and speak after a manner elevated above the common pitch of men, and to use phrases equal, in some measure, to the divine persons he introduced; and to this purpose served the poetical, figurative language, and the majesty of heroic verse.

To convey their truths to the best advantage, and adapt them to the particular purposes they were intended for, poets found out various forms. Hence the *epopœia* and drama. See *EPIC Poem*.

After all, poetry must be allowed to stand eminent among the other liberal arts; inasmuch as it refreshes the mind when it is fatigued, soothes it when it is agitated, relieves and invigorates it when it is depressed; as it elevates the thoughts to the admiration of what is beautiful, what is becoming, what is great and noble: nor is it enough to say, that it delivers the precepts of virtue in the most agreeable manner; it insinuates or instils into the soul the very principles of morality itself. Moreover, since the desire of glory, innate in man, appears to be the most powerful incentive to great and heroic actions, it is the peculiar function of poetry to improve this bias of our nature, and thus to cherish and enliven the embers of virtue: and since one of the principal employments of poetry consists in the cele-

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bration of great and virtuous actions, in transmitting to posterity the examples of the bravest and most excellent men, and in consecrating their names to immortality; this praise is certainly its due, that while it forms the mind to habits of rectitude by its precepts, directs it by examples, excites and animates it by its peculiar force, it has also the distinguished honour of distributing to virtue the most ample and desirable rewards of its labours.

The importance of this art is most eminently conspicuous, as employed on sacred subjects, and in subserviency to religion. This indeed appears to have been the original office and destination of poetry; and this it still so happily performs, that in all other cases it seems out of character, as if intended for this purpose alone. In other instances poetry appears to want the assistance of art, but in this to shine forth with all its natural splendour, or rather to be animated by that inspiration, which on other occasions is spoken of without being felt. These observations are remarkably exemplified in the Hebrew poetry, than which the human mind can conceive nothing more elevated, more beautiful, or more elegant; in which the almost ineffable sublimity of the subject is fully equalled by the energy of the language, and the dignity of the style. And it is worthy observation, that as some of these writings exceed in antiquity the fabulous ages of Greece, in sublimity they are superior to the most finished productions of that polished people.

Having considered the nature and excellence, and utility of poetry, and transiently compared it with philosophy, history, and oratory, specifying also the assistance which the poet derives in his imitation of nature from an extensive and accurate acquaintance with the sciences and other arts, we shall now proceed to give a brief sketch of its rise and progression.

It has been a prevalent opinion, sanctioned by the concurring voice of antiquity, that poetry is older than prose. This, however, is a kind of paradox, which needs explanation, because there never existed any period of society, in which men conversed together in poetical numbers. But from the commencement of the social state, they occasionally met together for feasts, sacrifices, and public assemblies; and on all such occasions, their principal entertainment consisted in music, song, and dance. In the rude effusions, which the enthusiasm of fancy or passion suggested to untaught men, when roused by interesting events, and by their meeting together in public assemblies, we discover the first beginnings of poetic composition. Two particulars, says Dr. Blair, would early distinguish this language of song, from that in which they conversed on the common occurrences of life; namely, an unusual arrangement of words, and the employment of bold figures of speech. The order of words would be inverted to suit the train in which they rose in the speaker's imagination, or to accommodate them to the cadence of the passion by which he was moved, and the various emotions of the mind would also suggest those modes of expression, which are now distinguished by the learned names of hyperbole, prosopopeia, simile, &c.; and which were the native language of poetry, among the most barbarous nations. The same impulse likewise which prompted the enthusiastic poetic style, would dispose to a certain melody, or modulation of sound, suited to the different emotions of joy or grief, of admiration, love, or anger. Music and poetry, therefore, have the same origin; they were prompted by the same occasions; they were united in song; and as long as they continued united, they tended, without doubt, mutually to heighten and exalt each other's power. The first poets sung their own verses; and hence

sprung versification, or words arranged in a more artful order than prose, so as to be suited to some tune or melody.

If the actual origin of poetry be inquired after, says Dr. Lowth, it must be referred to religion; and since it appears to be an art derived from nature alone, peculiar to no age or nation, and only in an advanced state of society conformed to rule and method, it must be wholly attributed to the more violent affections of the heart, the nature of which is to express themselves in an animated and lofty tone, with a vehemence of expression far remote from vulgar usage. It is no less observable also, that these affections break and interrupt the enunciation by their impetuosity; they burst forth in sentences pointed, earnest, rapid, and tremulous; and in some degree the style, as well as the modulation, is adapted to the emotions and habits of the mind. Is it not probable, continues the same author, that the first effort of rude and unpolished verse would display itself in the praise of the Creator, and flow almost involuntarily from the enraptured mind? This at least is certain, that poetry has been nurtured in those sacred places, where she seems to have been first raised into existence; and that her original occupation was in the temple and at the altar. However ages and nations may have differed in their religious sentiments and opinions, in this at least we find them all agreed, that the mysteries of their devotion were celebrated in verse. According to Plato (*De Leg. lib. iii.*), the most ancient poetry, as well as music, was that which was addressed to the Deity, under the appellation of hymns. Although the Greeks, who are fond of attributing to their own nation the invention of all sciences and arts, have ascribed the origin of poetry to Orpheus, Linus, and Musæus, yet long before such names were heard of, and among nations where they were never known, poetry existed. Poetry, and also music, so far from being arts that belong only to polished nations, have their foundation in the nature of man, and belong to all nations and ages; though, like other arts founded in nature, they have been more cultivated, and, from a concurrence of favourable circumstances, carried to greater perfection in some countries than in others. Indeed, before any characters expressive of sounds were invented, at least before they were commonly received, and applied to general use, it seems to have afforded the only means of preserving the rude science of the early times; and, in this respect, to have rendered the want of letters more tolerable. It seems also to have acted the part of a public herald, by whose voice each memorable transaction of antiquity was proclaimed, and transmitted through different ages and nations. Such appears, by the testimony of authors, to have been the undoubted origin of poetry among heathen nations. Upon the whole it may be observed, that the first compositions, which were either recorded by writing, or transmitted by tradition, could be no other than poetical compositions. Nothing could attract the attention of savage tribes, addicted only to hunting and war, rouse the speaker to pour himself forth, or draw the crowd to listen, but the high powers of passion, of music, and of song. This vehicle, and no other, could be employed by chiefs and legislators, when they meant to instruct or to animate their tribes. Besides, before writing was invented, songs only could last and be remembered. The ear assisted the memory by the help of numbers; fathers repeated and sung them to their children; and by this oral tradition of national ballads, were conveyed all the historical knowledge, and all the instruction of the first ages. Greece, for several successive ages, possessed no records but the poetic. Priests, philosophers, and statesmen, all delivered their instructions in poetry. Apollo, Orpheus,

POETRY.

Orpheus, and Amphion, their most ancient bards, are represented as the first founders of law and civilization. Minos and Thales sung to the lyre the laws which they composed; and till the age immediately preceding that of Herodotus, history had assumed no other form but that of poetical tales.

The first person who published a prose oration was Pherecydes of the isle of Syrus, or Scyros, contemporary with king Cyrus, who lived some ages posterior to that of Homer and Hesiod; and somewhat after that time, Cadmus the Milesian began to compose history. (Strabo, lib. i. Plin. Nat. Hist. l. vii. 56. and v. 29.) "It is well known," says Isidorus (Hispal. Orig. l. i. 27.), "that among the Greeks, as well as among the Latins, metrical composition was much more ancient than prose. Every species of knowledge was at first contained in poetry; it was long before prose composition flourished. The first man among the Greeks, who composed in prose, was Pherecydes Syrius: among the Romans, Appius Cæcus first published a work in prose against Pyrrhus." The laws themselves were metrical, and adapted to certain musical notes: such were the laws of Charondas, which were sung at the banquets of the Athenians; such were those which were delivered by the Cretans (Ælian, Nat. Hist. l. ii. 39.) to the ingenuous youth to be learned by rote, with accompaniments of musical melody, in order that, by the enchantment of harmony, the sentiments might be more forcibly impressed upon their memories. Hence certain poems were denominated *νόμοι* (nomoi), which implied convivial or banqueting songs, as is remarked by Aristotle (Prob. S. 19. Q. 28.); who adds, that the same custom of chanting the laws to music existed even in his own time among the Agathyrsi. If we may credit Strabo (Geog. l. iii.), the Turdetani, a people of Spain, had laws in verse; but the Germans, as Tacitus positively asserts, had no records or annals but the traditional poems, in which they celebrated the heroic exploits of their ancestors. In the same manner, and on the same account, the Persians, the Arabs, and many of the most ancient Eastern nations, preserved in verse their history and politics, as well as the principles of religion and morals. Among the Scythian or Gothic nations, many of their kings and leaders were scalds or poets; and it is, as Dr. Blair observes, from their Runic songs, that the most early writers of their history, such as Saxo-Grammaticus, acknowledge, that they had derived their chief information. Among the Celtic tribes, in Gaul, Britain, and Ireland, we know in what admiration their bards were held, and what great influence they possessed over the people. They were both poets and musicians, as all the first poets in every country were. They were always near the persons of the chief or sovereign; they recorded all his great exploits; they were employed as the ambassadors between contending tribes, and their persons were held sacred. Whatever may be thought of the antiquity of Ossian's poems, it is certain that in the Highlands of Scotland there are many remains of the ancient historical ballads, which, though probably of a much later date than the age of Ossian is pretended to be, contain many marks of wild genius, and furnished Mr. Macpherson, as it has been said, with the bulk of his materials.

All science, human and divine, seems to have been deposited in the treasury of the muses, and thither it was necessary, on every occasion, to resort. The only mode of instruction, as bishop Lowth observes, adapted to human nature in an uncivilized state, when the knowledge of letters was very little, if at all, diffused, must be that which is calculated to captivate the ear and the passions, which assists the memory, which is not to be delivered into the hand, but

infused into the mind and the heart. Poetry, as professor Michaelis remarks, is much less liable to be corrupted than prose. So faithful a preserver of truth is metre, that what is liable to be changed, augmented, or violated, almost daily in prose, may continue for ages in verse, without variation, without even a change in the obsolete phraseology. The ancient use of poetry has been traced by the learned prelate, whose admirable "Prælections" have been often cited, not only in the writings of Moses, but in the most remote periods of the Mosaic history. The address of Lamech to his wives (Gen. iv. 23, 24.) presents an indubitable specimen of the poetry of the first ages. Michaelis, among the fragments of verse that are scattered through the writings of Moses, mentions his relation (Gen. iii. 24.) of the cherubs placed at the east of the garden of Eden, under which appellation the professor understands to be meant, not angels, but the "equi tonantes" of the Greek and Latin poets. The passage, he says, is unquestionably poetical. "He placed before the garden cherubims (*thundering horses*) and a flaming sword, to keep the way of the tree of life;" in plain terms, the dread of the frequent tempests and daily thunders deterred men from that track, in which paradise was situated, lest they should eat of the tree of life. Another example of genuine poetry is the execration of Noah upon Ham, with the magnificent predictions of prosperity to his two brothers, to Shem in particular, and the ardent breathings of his soul for their future happiness. (Gen. ix. 25, 27.) The inspired benedictions of the patriarchs Isaac and Jacob are altogether of the same kind. (Gen. xxvii. 27—29. 39, 40.) Many other examples of a similar kind might be produced, which would serve to shew, that the poetry, analogous to the specimens of Hebrew poetry, still remaining, was neither originally the production of Moses, nor peculiar to the Jewish nation; but that it may be accounted among the first fruits of human ingenuity, and was cultivated by the Hebrews and other eastern nations from the first ages, as the recorder of events, the preceptor of morals, the historian of the past, and prophet of the future. See Gen. xxi. 6, 7. xxiv. 60. xxv. 23. xxviii. 16, 17. Numb. xii. 6—8. See *HEBREW Poetry*.

Among the first poetic compositions we may reckon odes and hymns, dictated by religious feelings: plaintive or elegiac poetry would as naturally arise from lamentations over deceased friends: epic poetry derived its origin from the recital of the achievements of their heroes and ancestors; and not contented with simply reciting these, they would be led, at some of their public meetings, to represent them, by introducing different bards speaking in the character of their heroes, and answering each other, in which practice we discern the first outlines of tragedy, or dramatic writing. But, in the first ages of society, none of these kinds of poetry were properly distinguished or separated, as they are now, from each other. At first, history, eloquence, and poetry were all the same; but when the progress of society induced a separation of the different arts and professions of civil-life, it led also by degrees to a separation of the different literary provinces from each other. In process of time the art of writing was invented; and afterwards poetry became a separate art, calculated chiefly to please, and confined generally to such subjects as related to the imagination and passions. Even its earliest companion, music, was in a great measure divided from it. The first poetry of all nations was rude and artless, but at the same time it had somewhat in it that captivated and transported the mind. In after ages, when poetry became a regular art, studied for reputation and for gain, authors began to affect what they did not feel. Composing coolly in their closets, says Dr. Blair,

Blair, they endeavoured to imitate passion rather than to express it; they tried to force their imagination into raptures, or to supply the defect of native warmth, by those artificial ornaments, which might give composition a splendid appearance.

The separation of music from poetry produced consequences not favourable in some respects to poetry, and in many respects hurtful to music. (See Dr. Brown's Dissertation on the Rise, Union, and Separation of Poetry and Music.) As long as they remained united, music enlivened and animated poetry, and poetry gave force and expression to musical sound. Music was then in a simple state; and the poet's strain was always heard. In this state it produced all the great effects ascribed to it in ancient story. From simple music only, and from music, accompanied with verse or song, we are to look for strong expression, and powerful influence over the human mind. But when instrumental music came to be studied as a separate art, divested of the poet's song, and formed into the artificial and intricate combinations of harmony, it lost all its ancient power of inflaming the hearers with strong emotions; and sunk into an art of mere amusement, among polished and luxurious nations. Still, however, poetry preserves, in all countries, some remains of its first and original connection with music. By being uttered in song, it was formed into numbers, or into an artificial arrangement of words and syllables, very different in different countries; but such, as to the inhabitants of each, seemed most melodious and agreeable in sound. Hence arises that great characteristic of poetry, which we now call *verse*. See VERSE and VERSIFICATION.

The first poetry of nations acquires some diversity from difference of climate, and of manner of living; chiefly, as those nations are of a more ferocious, or a more gentle spirit, and according as they advance more rapidly or more slowly in the arts of civilization. Hence we find all the remains of the ancient Gothic poetry remarkably fierce, and breathing nothing but slaughter and blood; while the Peruvian and Chinese songs turned, from the earliest times, upon milder subjects. The Celtic poetry, in the days of Ossian, though chiefly of the martial kind, yet had attained a considerable mixture of tenderness and refinement; in consequence of the long cultivation of poetry among the Celtæ, by means of a series and succession of bards, which had been established for ages. Among the Grecian nations, their early poetry appears to have soon received a philosophical cast, from what we are informed concerning the subjects of Orpheus, Linus, and Musæus, who treated of creation and of chaos, of the generation of the world, and of the rise of things; and it is known that the Greeks advanced sooner to philosophy, and proceeded with a quicker pace in all the arts of refinement, than most other nations. The metrical compositions of the Arabians were of two sorts, one, which they compared to loose pearls, and the other to pearls strung. In the former, the sentences or verses were unconnected; and their beauty arose from the elegance of the expression, and the acuteness of the sentiment. (See ARABIC Poetry.) The moral doctrines of the Persians were generally comprehended in independent proverbial apophthegms, formed into verse; bearing, in this respect, a considerable resemblance to the Proverbs of Solomon. The book of Job is also in the same form of composition. Lowth's Lectures on the Sacred Poetry of the Hebrews translated by Gregory, vol. i. Beattie's Essays on Poetry and Music. Blair's Lectures, vol. iii.

During the decline of the Roman empire, many causes concurred to accelerate the relapse of the Latin poetry into barbarism. Among these we may mention the growing in-

crease of Christianity which deprived it of its old fabulous embellishments, and in consequence of which it was chiefly employed in composing ecclesiastical hymns. Amidst these impediments, however, and the necessary degeneration of taste and style, a few poets supported the character of the Roman muse with tolerable dignity at this period. These were Ausonius, Paulinus, Sidonius, Sedulius, Arator, Juvenius, Prosper, and Fortunatus. With the last, who flourished at the beginning of the sixth century, and was bishop of Poitiers, the Roman poetry is supposed to have expired.

For an account of the introduction and progress of English poetry, with its distinguishing characters and writers at different periods in the more early ages, we refer to Mr. Warton's History of English Poetry, &c.

The first age of English poetry, in the reign of Elizabeth, displayed a fantastic combination of chivalrous fancy and feeling with classical pedantry; but, upon the whole, the native genius was unsubdued; and the poems of that age, with all their faults, and partly perhaps from their faults, are the most national part of our poetry, as they undoubtedly contain its highest beauties. From the accession of James I. to the civil war, the glory of Shakspeare turned the whole national genius to the drama; and, after the restoration, a new and classical school arose, under which our old and classical literature was abandoned, and almost forgotten. But all imported tastes in literature must be in some measure superficial. The poetry which grew in the bosoms of a people is always capable of being revived by a skilful hand. When the brilliant and poignant lines of Pope began to fall on the public ear, it was natural that we should revert to the cultivation of our indigenous poetry. During the greater part of the 18th century, the connection of the character of English poetry with the state of the country was very easily traced. The period which extended from the English to the French revolution was the golden age of authentic history. Governments were secure, nations tranquil, improvements rapid, and manners mild beyond the example of any former age. The English nation, which possessed the greatest of all national blessings, a wisely constructed popular government, necessarily enjoyed the largest share of every other benefit. The tranquillity of that fortunate period was not disturbed by any of those calamities, or even extraordinary events, which excite the imagination and inflame the passions. No age was more exempt from the prevalence of any species of popular enthusiasm. In this state of things, poetry partook of that calm, argumentative, moral, and directly useful character into which it naturally subsides, when no events occur to rouse the higher passions; when every talent is allured into the immediate service of a prosperous and improving society; and when wit, taste, diffused literature, and fastidious criticism, combine to deter the young writer from the more arduous enterprises of poetical genius. In such an age, every art becomes rational. Reason is the power which presides in a calm: but reason guides, rather than impels; and, though it must regulate every exertion of genius, it never can rouse it to vigorous action.

The school of Dryden and Pope, which prevailed till a very late period of the last century, is neither the most poetical nor the most national part of our literary annals. These great poets sometimes indeed ventured into the regions of pure poetry. But their general character is, that "not in fancy's maze they wandered long;" that they rather approached the elegant correctness of our continental neighbours, than supported the daring flight which, in the former age, had borne English poetry to a sublimer elevation, than that of any other modern people of the West,

Towards

Towards the middle of the eighteenth century, great, though quiet changes, began to manifest themselves in the republic of letters, in every European nation which retained any portion of mental activity. About that time, the exclusive authority of our great rhyming poets began to be weakened; new tastes and fashions began to shew themselves in the political world. A school of poetry must have prevailed long enough, to be probably on the verge of downfall, before its practice be embodied in a correspondent system of criticism. Johnson was the critic of our second poetical school. As far as his prejudices of a political or religious kind did not disqualify him for all criticism, he was admirably fitted by nature to be the critic of this species of poetry. Without more imagination, sensibility, or delicacy than it required,—not always with perhaps quite enough for its higher parts,—he possessed sagacity, shrewdness, experience, knowledge of mankind, a taste for rational and orderly compositions, and a disposition to accept, instead of poetry, that lofty and vigorous declamation in harmonious verse, of which he himself was capable, and to which his great masters sometimes descended. His spontaneous admiration scarcely soared above Dryden. “Merit of a loftier class he rather saw than felt.” Shakspeare has transcendent excellence of every sort, and for every critic, except those who are repelled by the faults which usually attend sublime virtues,—character and manners, morality and prudence, as well as imagery and passion. Johnson did indeed perform a vigorous act of reluctant justice towards Milton; but it was a proof, to use his own words, that

“At length our mighty Bard’s victorious lays
Fill the loud voice of universal praise;
And baffled Spite, with hopeless anguish dumb,
Yields to renown the centuries to come!”

The deformities of the life of Gray ought not to be ascribed to jealousy—for Johnson’s mind, though coarse, was not mean—but to the prejudices of his university, his faction, and his poetical sect: and this last bigotry is the more remarkable, because it is exerted against the most skilful and tasteful of innovators, who, in reviving more poetical subjects and a more splendid diction, has employed more care and finish, than those who aimed only at correctness.

The interval which elapsed between the death of Goldsmith and the rise of Cowper, is perhaps more barren than any other twelve years in the history of our poetry since the accession of Elizabeth. It seemed as if the fertile soil was at length exhausted. But it had in fact only ceased to exhibit its accustomed produce. The established poetry had worn out either its own resources, or the constancy of its readers. Former attempts to introduce novelty had been either too weak, or too early. Neither the beautiful fancy of Collins, nor the learned and ingenious industry of Warton, nor even the union of sublime genius with consummate art in Gray, had produced a general change in poetical composition. But the fulness of time was approaching; and a revolution has been accomplished, of which the commencement nearly coincides (not as we conceive accidentally) with that of the political revolution which has changed the character as well as the condition of Europe.

As the condition and character of the former age had produced an argumentative, didactic, sententious, prudential, and satirical poetry; so, the approaches to a new order (or rather at first disorder) in political society, were attended by correspondent movements in the poetical world.—Bolder speculations began to prevail. A combination of the science and art of the tranquil period, with the hardy

enterprizes of that which succeeded, gave rise to scientific poems, in which a bold attempt was made, by the mere force of diction, to give a poetical interest and elevation to the coldest parts of knowledge—and to those arts which have been hitherto considered as the meanest. Having been forced above their natural place by the first wonder, they have not yet recovered from the subsequent depression; nor will a similar attempt be successful, without a more temperate use of power over style,—until the diffusion of physical knowledge renders it familiar to the popular imagination,—and till the prodigies worked by the mechanical arts shall have bestowed on them a character of grandeur. For other observations of a similar kind, we refer to the critique on Rogers’s Poems, art. 2. Edinb. Rev. N^o 43, the anonymous author of which considers the present as one of the most flourishing periods of English poetry.

When classical studies revived amidst the chivalrous manners and feudal institutions of Gothic Europe, the imitation of ancient poets struggled against the power of modern sentiments, with various event, in different times and countries; but every where in such a manner as to give somewhat of an artificial and exotic character to poetry. Jupiter and the Muses appeared in the poems of Christian nations. The feelings and principles of democracies were copied by persons belonging to Teutonic monarchies or aristocracies. The sentiments of the poet in his verse were very different from those which actuated his conduct. The forms and rules of composition were borrowed from antiquity, instead of spontaneously arising from the manner of thinking of modern communities. In Italy, when letters first revived, the chivalrous principle was too near the period of its full vigour to be oppressed by the foreign learning. Ancient monuments were borrowed; but the romantic form was prevalent; and where the forms were classical, the spirit continued to be romantic. The structure of Tasso’s poem was that of the Grecian epic; but his heroes were Christian knights. French poetry, having been somewhat unaccountably late in its rise, and slow in its progress, reached its brilliant period, when all Europe had considerably lost its ancient characteristic principles, and was fully impregnated with classical ideas. Hence it acquired faultless elegance; and hence also it became less natural, more timid and more imitative; more like a feeble translation of Roman poetry. See ROMANCE, RUNIC, SCALDS, SCANDINAVIA, SAXON, &c.

POETRY, *the Laws of Epic and Dramatic*, see under EPIC, CHARACTER, INVOCATION, DRAMATIC, THEATRE, TRAGEDY, COMEDY, ACT, SCENE, and SENTIMENT. For the lower sorts of poetry, see ODE, SONG, EPIGRAM, EPITAPH, ELEGY, SATIRE, &c.

POETRY, *Allegorical*. See ALLEGORY and FABLE.

POETRY, *Descriptive*. See DESCRIPTION.

POETRY, *Didactic*. See DIDACTIC.

POETRY, *Hebrew*. See HEBREW Poetry.

POETRY, *Language of*. See POETIC Language.

POETRY, *Lyric*. See LYRIC Poetry and ODE.

POETRY, *Pastoral*. See PASTORAL Poetry.

POETRY, *Prophetic*. See PROPHETIC Poetry.

POFIG, in *Geography*, a town of Bohemia, in the circle of Boleslaw; 10 miles N.W. of Jung-Buntzel.

POGAH, a town of Hindoostan, in Bahar; 57 miles S.S.W. of Patna. N. lat. 24° 53'. E. long. 84° 45'.

POGAR, a town of Russia, in the government of Novgorod Sieverskoi; 20 miles N. of Novgorod Sieverskoi. N. lat. 52° 18'. E. long. 33° 14'.

POGATOVA, a town of Russia, in the government of Archangel; 92 miles S.E. of Oneg.

POGEN, a town of Bavaria, on a river of the same name, which soon after runs into the Danube; six miles E. of Straubing.

POGGE, in *Ichthyology*. See *Cottus Cataphractus*.

POGGIO, in *Geography*, a town of Italy, in the department of the Mincio; 20 miles S.E. of Mantua.—Also, a town of Italy, in the department of the Lower Po; seven miles E. of Cento.—Also, a town of the Ligurian Republic; seven miles W. of Genoa; and another 15 miles S.W. of Genoa.—Also, a town of Etruria, called *Villa Imperiale*, where the late grand duke had a palace; eight miles S.E. of Florence.

POGGIOBONZI, a town of Etruria; 21 miles S.E. of Florence.

POGGY or POGGU, *Pulo*, called also *Nassau Islands*, (see *NASSAU*), are two islands, forming part of the range of islands that lie before the W. coast of Sumatra, and separated from each other by a narrow channel. The inhabitants of these islands and of the island Mantawaye are universally tattooed in the shape of birds and beasts, and their skin discoloured. Neither of these two islands is the largest of the range. “Pulo Neas” has the greatest circumference; and this, if we except “Pulo Babe,” is the northernmost, and not far distant from Natal, on the coast of Sumatra, where the English have a settlement, and whence a great trade is carried on to the island of Neas, in rice and slaves, and of the latter not less than 450 annually, besides about 150 which go to the northern ports; in taking these unfortunate victims of the avarice of the chiefs, it is computed that no fewer than 200 are killed. The people of Neas are small in their persons, of a fair complexion, particularly the women, who are mostly sent to Batavia. Many of both sexes are infected with a kind of leprosy, which is an hereditary disease, though not contagious. Their ears are made to extend so as to admit of an aperture large enough for the hand to pass through, and so as almost to touch the shoulders, though the purchasers of females sometimes have them trimmed to the natural size. The islanders are remarkable for their ingenuity in handicraft works; and they practise letting blood by cupping in a manner similar to ours; their principal food is pork, and the chiefs ornament their houses with the jaws of the hogs as well as the skulls of the enemies whom they kill; in their disposition they are revengeful, and are accounted dangerous as domestic slaves. Earthquakes, which are common in Sumatra, extend to these islands; in 1763 an entire village was swallowed up in that of Neas. The island of Nassau is high, but not mountainous, and may be discerned, in clear weather, at the distance of eight or nine leagues. The S.E. point, called “Fish” point, runs out very low, and one or two leagues to the S. of it lie two small, and about four or five leagues further, one somewhat larger island. This last has by some been taken for the island “Met de Reeven,” or Reef island, (Pulo Mego); but the latter lies in S. lat. 3° 55', whereas the former is in 3° 30'. “Pulo Mego,” as well as some other of these islands, is uninhabited, except by rats and squirrels, that subsist on the cocoa-nuts which they produce, and which are occasionally carried off in vessels from Sumatra to that island. All these small islands are skirted near the sea-beach with cocoa-nut trees, which grow so thick together, that they almost choak each other, whilst the interior parts are entirely free from them; this is occasioned by the accidental floating of the nuts to the shore, where being planted, as it were, by the hand of nature, they shoot forth and bear fruit, and thus supply materials for reproduction. Mr. Marsden supposes that this chain of islands may probably have once formed a part of

the Main, and have been separated from it, either by some violent effort of nature, or by the gradual attrition of the sea. Various appearances confirm this supposition. The food of these islanders consists of yams, crabs, plantains, and cocoa-nuts. The dress of the women is only a piece of cloth wrapped round the middle, and reaching within two or three inches of the knee. Marsden's Sumatra. Stavorinus's Voyages, vol. iii.

POGINSK, a town of Russia, in the government of Pskov, on the Louvat; 16 miles N.N.W. of Veliki Luki.

POGLIZA, a district of Dalmatia, between the river Cetina and the Adriatic.

POGNY, a town of France, in the department of the Marne, on the Marne; nine miles S.S.E. of Châlons sur Marne.

POGO, in *Ornithology*, a name by which the inhabitants of the Philippine islands call their quail: it is very like our common quail, but smaller.

POGOIANA, in *Geography*, a town of European Turkey, in Macedonia; nine miles N. of Saloniki.

POGONIA, in *Botany*, from *πρωγων*, a beard, a genus founded by Jussieu, to which he refers various plants of the natural order of *Orchideæ*, that have a fringed or bearded lip to their nectary, without a spur. Mr. Brown limits it to such as have a terminal permanent anther; a sessile hooded lip, crested on the inside; five separate petals destitute of glands and farinaceous pollen.—Juss. 65. Brown in Ait. Hort. Kew. v. 5. 203. Class and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*.

The only species mentioned as cultivated in our garden is

P. divaricata. Lily-leaved Pogonia. (*Arethusa divaricata*; Linn. Sp. Pl. 1346. Willd. Sp. Pl. v. 4. 81. Pursh v. 2. 590. Lamarck Illustr. t. 729. f. 3. Helleborine lili folio caulem ambiente, &c.; Catesb. Carol. v. 1. t. 58.)—Root somewhat palmate. Stem-leaf and bractea linear-oblong. Calyx-leaves linear-lanceolate.—Found in swamps near the sea-coast, from Virginia to Florida, blossoming in July. Mr. Frazer brought living plants to England in 1787. The root is perennial. Stem two feet high, simple, single-flowered, smooth, bearing a short sheath near the bottom, a linear-oblong smooth leaf about the middle, and a bractea, of smaller size, at the top, under the large handsome flower, which has a dull-purple calyx, with broader rose-coloured petals and nectary.

POGONIA is used by Mr. Andrews, in his Repository t. 212 and 283, as a name for the genus previously called *MYOPORUM*; see that article, as well as Ait. Hort. Kew. v. 4. 60.

POGONIA, according to Ambrosinus, is a name for the chestnut, alluding to its bristly or bearded covering.

POGOR, in *Geography*, a river on the W. coast of the island of Borneo, which runs into the sea, S. lat. 0° 5'.

POGORE, a town of Germany, in the county of Goritz; four miles W. of Goritz.

POHAN, a town of Persia, in the province of Laristan; 15 miles N.E. of Tarem.

POHERBICZE, a town of Russian Poland; 35 miles E.N.E. of Winnicze.

POHLEN, a town of Saxony, in the Vogtland; four miles N.N.E. of Plauen.

POHLIA, in *Botany*, so named by Hedwig, after his friend John Ehrenfreid Pohl, physician to the Elector of Saxony, and professor of Botany at Leipzig, who was born in 1746, and published, in 1771, a dissertation on the structure and figure of the leaves of plants, which may

be found in Usteri's *Delectus Opusc. Bot.* v. 1. 145. This genus consists of only one species, belonging to the natural order of *Musci*; *P. elongata*; Hedw. Crypt. v. 1. 96. t. 36. Sp. Musc. 171. (*Bryum elongatum*; Dickf. Crypt. fasc. 2. 8. Sm. Fl. Brit. 1349. Engl. Bot. t. 1603.) It is, like the *Webera* of Hedwig, a *Bryum*, in which both organs of impregnation are in the same flower; *Poblia* and *Webera* differing from each other in a most trifling character only, founded on the divisions of the inner fringe. See BRYUM.

There is no question that Dr. Pohl deserves botanical commemoration, but the system is overloaded with names too nearly alike; see POLIA and POLLIA; the latter only will probably remain.

POHOFT, in *Geography*, a town of Lithuania; 16 miles S. of Pinsk.

POJAUHTECATL, a mountain of Mexico, which discharged smoke from the year 1545 to 1565, and then the smoke ceased: its form is conical, and it is so lofty that navigators perceive it from the gulf of Mexico, at the distance of 150 miles; 40 miles W.S.W. of Vera Cruz.

POIG, a river which runs into the gulf of Trieste, about one mile N. of Trieste.

POILE, LA, a bay on the S. of Newfoundland; 32 miles E. of Cape Ray.

POINCIANA, in *Botany*, was so named by Tournefort, in compliment to M. de Poinci, governor of the Antilles in the middle of the 17th century, who is said to have paid considerable attention to the natural history of those islands. His remarks have not reached us. The genus in question was adopted by Linnæus, and the generality of botanists; till Dr. Solander first judged it to be not clearly distinct from CÆSALPINIA, in which it is now sunk; see that article.

POINCIANA, in *Gardening*, comprehends plants of the shrubby, flowering, exotic kind, of which the species chiefly cultivated are, the fair poinciana or double-spined Barbadoes flower fence (*P. pulcherrima*); the bijugated single-spined poinciana (*P. bijuga*); and the loftier spineless poinciana (*P. elata*).

Method of Culture.—These plants are commonly increased by means of the seeds, which are annually received from the West Indies and sown in small pots of light earth, plunging them into some hot-bed or into the bark-bed of the stove, where they soon come up in a plentiful manner. When about three or four inches in height, the young plants should be pricked out into small separate pots, plunging them again into the bark-bed of the stove until they become of a good size, giving them occasional waterings, when they mostly make a rapid growth. Afterwards, as they advance in size, they should be shifted, with balls of earth about their roots, into larger pots, being plentifully supplied with water in the summer season, but sparingly in the winter time. In this way they commonly grow well, advancing fast in height, and in a short time begin to display their elegant flowers. They must be kept constantly in the stoves or hot-houses in this country, where they generally begin to flower in the autumn or winter, imparting a very agreeable fragrance, and are highly ornamental.

POINSON, in the *Manege*, is a little point or piece of sharp pointed iron, fixed in a wooden handle, which the cavalier holds in his right-hand when he means to prick a leaping horse in the croupe, or beyond the end of the saddle, in order to make him jerk out behind.

POINT, derived from *punctum*, which is formed from *pungere*, to prick, is a term in various arts.

POINTS, in *English Antiquity*, were a necessary article in the dress at least of men; and mention of them frequently occurs in the ancient comedies and other old books.

They were pieces of string about eight inches in length, consisting of three strands of cotton yarn, of various colours twisted together, and tagged at both ends with bits of tin-plate: their use was to tie together the garments worn on different parts of the body; particularly the breeches, or hose as they were called: hence the phrase, to untruss a point. With the leathern doublet or jerkin, buttons were introduced, which in time rendered points useless. These points continued to be given on Ascension-day to boys that perambulated the parishes, together with willow wands, as a kind of honorary rewards, though distinguished only by the name of tags, and become useless.

POINT, in *Architecture*. *Arches of the third point*, and *arches of the fourth point*. See ARCHES.

POINT, *Gauge*. See GAUGE.

POINT, in *Astronomy*, is a term applied to certain parts or places marked in the heavens, and distinguished by proper epithets.

The four grand points or divisions of the horizon, *viz.* the east, west, north, and south, are called the *cardinal* points. (See CARDINAL: see also EAST, WEST, &c.) The zenith and nadir are the *vertical* points.

The points, in which the orbits of the planets cut the plane of the ecliptic, are called the *nodes*.

The points, in which the equator and ecliptic intersect, are called the *equinoctial* points. Particularly that, whence the sun ascends towards the north pole, is called the *vernal* point. And that, by which he descends to the south pole, the *autumnal* point.

The points of the ecliptic, where the sun's ascent above the equator, and descent below it, terminate, are called the *solstitial* points. Particularly the former of them the *estival* or *summer* point, the latter, the *brumal* or *winter* point.

POINTS, in *Electricity*, are those acute terminations of bodies which facilitate the passage of the electrical fluid *from* or *to* such bodies.

Mr. Jallabert was, probably, the first person who observed that a body, pointed at one end and round at the other, produced different appearances upon the same body, according as the pointed or round end was presented to it. But Dr. Franklin first observed and evinced the entire effect of pointed bodies, both in drawing and throwing off electricity at greater distances than other bodies could do it; though he candidly acknowledges, that the power of points to throw off the electric fire was communicated to him by his friend Mr. Thomas Hopkinson. Dr. Franklin electrified an iron shot three or four inches in diameter, and observed, that it would not attract a thread, when the point of a needle, communicating with the earth, was presented to it; but he found it impossible to electrify an iron shot, when a sharp needle lay upon it. He also observed, that a piece of leaf gold, suspended between two plates (see *Experiments in ELECTRICITY*), always removed farther from that plate to which its sharpened point was presented; and that if one of the points was very blunt and the other very sharp, it would be suspended in the air by its blunt end, though no electrified plate was held below it.

This remarkable property, possessed by pointed bodies, of gradually and silently receiving or throwing off the electric fluid, has been evinced by a variety of familiar experiments. Thus, if one hand be applied to the outside coating of a large jar fully charged, and the point of a needle, held in the other, be directed towards the knob of the jar,

and moved gradually near it, till the point of the needle touches the knob or ball, the jar will be entirely discharged, so as to give no shock at all, or a shock scarcely sensible. In this case the point of the needle has gradually and silently drawn away the super-abundant electricity from the electrified jar.

Farther, if the knob of a brass rod be held at such a distance from the prime conductor, that sparks may easily escape from the latter to the former whilst the machine is in motion; and when this is the case, if the point of a needle be presented, though at twice the distance of the rod from the conductor, no more sparks will be seen passing to the rod: when the needle is removed, the sparks will be seen, but upon presenting it again they will disappear, so that the point of the needle draws off silently almost all the fluid, which is thrown by the cylinder or globe of the machine upon the prime conductor. This experiment may be varied by fixing the needle upon the prime conductor with the point upwards; and then, though the knob of a discharging rod or the knuckle of the finger be brought very near the prime conductor, and the excitation be very strong, no spark will be perceived, or if there be any, it will be exceedingly small.

The influence of points is also evinced in the amusing experiment, commonly called the electrical horse-race. See *Experiments in ELECTRICITY*.

Again, if a small lock of cotton be suspended from the prime conductor by a thread, and electrified, its filaments will repel one another, and extend themselves towards the nearest conductor; but if the finger or the knob of a rod be presented to it, it will move toward the finger or knob, and endeavour to touch it: at the same time let a pointed needle be presented with the other hand to the cotton a little above the end of the finger, and it will shrink upwards and move towards the prime conductor; but upon removing the needle, the cotton will return towards the finger; on presenting the needle again, it will shrink; and hence it is inferred, that the point of the needle draws off the electric fluid from the cotton, so that it is capable of being attracted by the prime conductor, an effect which the finger or blunt end of the wire could not produce. See *THUNDER-House*.

The late Mr. Henly exhibited the efficacy of pointed bodies by suspending a large bladder well blown and covered with gold, silver, or brass leaf, by means of gum water, at the end of a silken thread six or seven feet long, hanging from the ceiling of a room, and electrifying the bladder by giving it a strong spark with the knob of a charged bottle: he then presented to it the knob of a wire, which caused the bladder to move towards the knob, and when nearly in contact to give it a spark, and thus to discharge its electricity. By giving the bladder another spark, and presenting to it the point of a needle, the bladder was not attracted by the point, but rather receded from it, especially if the needle was suddenly presented towards it. But experiments evincing the efficacy of pointed bodies for silently receiving or throwing off the electric fluid, may be infinitely diversified according to the fancy or convenience of the electrician; and in a work of this kind it is needless to enumerate them.

In connection with this subject it may be proper to remember, that, in case of points throwing off or receiving electricity, a current of air is sensible at an electrified point, which is always in the direction of a point, whether the electricity be positive or negative. This fact has been sufficiently ascertained by many electricians, and particularly by Dr. Priestley and Sig. Beccaria: the explication of it will be subjoined in the sequel of this article.

Dr. Priestley contrived to exhibit the influence of this current on the flame of a candle, presented to a pointed wire, electrified negatively as well as positively. The blast was so strong (and in both cases alike) as to lay bare the greatest part of the wick, the flame being driven from the point; and the effect was the same, whether the electric fluid issued out of the point or entered into it. He diversified this experiment in a variety of ways, by placing the flame between two points, variously circumstanced in their connection with the prime conductor, electrified positively, and the floor; with the rubber and the floor; with the rubber and the conductor, &c. He also tried the force of this current upon paper vanes, stuck into the sides of a cork, which by means of a needle was suspended on a magnet: these vanes he held two or three inches from the point of a wire, communicating with the outside coating of a jar placed upon an electrical stand, and he observed, that whenever he took a spark from the wire communicating with the inside, the vanes were strongly blown up and made to turn, as if the current of air had flowed from the point; in which case, according to Dr. Franklin's theory, the electric fluid was entering it. If they were made to turn the contrary way, the current soon stopped them, and never failed to bring them back and make them move as before. This experiment was varied, and vanes were prepared of thin pieces of brass, which are conductors, and the effect was similar to that of the former. Dr. Priestley also found, as Mr. Wilson had before observed, that the vanes would not turn in vacuo, nor in a close unexhausted receiver where the air had no free circulation. In much the same manner Beccaria exhibited to sense the influence of the wind or current of air driven from points. See *Experiments in ELECTRICITY*.

POINTS, Theory of. Dr. Franklin endeavoured to account for the efficacy of points, by supposing that the base on which the electric fluid at the point of an electrified body rested being small, the attraction by which the fluid was held to the body was slight; and that, for the same reason, the resistance to the entrance of the fluid was proportionably weaker in that place than where the surface was flat: but he was not satisfied with this hypothesis. The facility with which pointed bodies receive or discharge the electric fluid may, perhaps, be more satisfactorily explained by considering, that the electric fluid, superinduced upon an insulated body, is confined upon that body by the surrounding air, and that electricity, by being continually communicated to the air, which is never a perfect electric, is gradually dissipated; whence it follows, that as a greater or less quantity of air is contiguous to a given quantity of electrified surface, that surface will lose its electricity more suddenly or more slowly. Thus, as the point of a needle, supposed to be connected with an electrified prime conductor, is surrounded by the air, the electricity will be dissipated more easily from that than from any other part of the prime conductor of the same dimensions, but exposed to a less quantity of air. Besides, the air about the point may be more easily moved in consequence of the electrical repulsion than at any other part of the surface of the prime conductor; and new air, *i. e.* unelectrified air, passes more frequently by it, which taking always part of the electricity of that body, farther promotes its dissipation. When the pointed body is negatively electrified, it acquires the electric fluid through the point more easily than through any other part of its surface; because the point presenting the least surface to the greatest quantity of air receives a proportionable greater quantity of the electric fluid.

Lord Mahon, (now earl Stanhope,) in his *Principles of Electricity*, in 1779, explains the influence of points in a different

different manner: he first premises, that electric atmospheres are constituted of the particles of air surrounding the electrified body: if, *e. gr.* the body be positively electrified, he maintains that it will deposit, upon all the particles of air that surround it, and come successively in contact with it, a proportional part of its superabundant electricity; so that they will become likewise positively electrified, and form a positively electrified atmosphere. The same reasoning is applied, *mutatis mutandis*, to negatively electrified bodies, and their negative atmospheres.

From this principle, and the observation that the density of an electrical atmosphere diminishes, in a certain ratio, as the distance from the electrified body increases, as well as from other considerations, his lordship undertakes to assign the cause why an electrified body, to which a projecting point is fixed, parts with or receives electricity more readily than a smooth cylinder or globular body: because the superabundant electricity of the body, supposing it to be positively electrified, which, in all cases, tends to quit it, will, when a point is fixed to it, meet with less resistance to its escape; as the point projects beyond the dense part of the electrical atmosphere of the body into the rarer, and, consequently, more unresisting part of that atmosphere. But the escape of the electric matter from any part of a smooth cylindrical body, positively electrified, is prevented or impeded; because every part of its surface is in contact with the densest part of its own strongly resisting electric atmosphere. The surface, too, of the point being extremely small, the less will be the resistance opposed to the escape of the superabundant electricity of the body into that rare part of its electrical atmosphere into which the point projects. Besides other illustrations of this principle, he produces the instance of a pointed wire, placed between two round or prominent metallic bodies, with its point on a level with their surface. In this situation, when presented to an electrified body, it acts no longer as a point, or only in a very small degree; because the dense parts of the electrical atmosphere of the two round bodies flows or is extended over it.

As for the current of air issuing from the points of bodies electrified *plus* or *minus*, Dr. Priestley observes, that it is not more difficult to be accounted for on Dr. Franklin's hypothesis of positive and negative electricity, than any other case of electrical repulsion. The particles of the atmosphere, near the points of electrified bodies, having by their means become possessed of more or less than their natural share of the electric fluid, must retire to places where they can discharge or replenish themselves as occasion may require. If it be asked why the particles of the atmosphere do not, in the same manner, recede from all the parts of the electrified body, as well as from the points; it is answered, that as the pressure of the atmosphere will prevent a vacuum, and as electrical attraction and repulsion are most powerful at the points of bodies, on account of the easier entrance or exit of the fluid at the points (upon whatever principle that effect depends), the electrified atmosphere, whether negative or positive, must fly off at the points preferable to any other places, and the weight of the atmosphere will force the air of the neighbouring places upon the flatter parts of the electrified conductor, notwithstanding the real endeavour it may have to recede from it. *Hist. of Elect.* vol. ii. p. 191. 8vo. edit. 1775.

Beccaria accounts for this phenomenon by observing, that points annexed to electrified bodies, or presented to them, throw into the contiguous air, or draw from it the electrified fire with such a force, that in both cases they repel from themselves the air, either loaded with part of the fire with which they superabound, or deprived of its own

fire, if these bodies were themselves in a state of negative electricity: and these points, while they drive away the air next to them, throw into or draw from the air, which laterally succeeds the electrical fire; and they do this in such a divided manner, that little light or noise is produced, but with such rapidity, that a great quantity of fire is really discharged in a small space of time. He accordingly distinguishes between that tickling sensation, which the electrical fire excites in us, when the face or hand is immersed into the atmosphere of an electrified body, and the current of air above mentioned. The excessive fire, he says, which actuates this atmosphere, drives the natural fire from the contiguous air to the face, &c. and this fire, in passing into the skin, produces the sensation of tickling: but if the body near which we stand be negatively electrified, the fire within the skin flows to the external surface of it, and thus the same kind of feeling is produced, whether the fire issues out of the body, or passes into it. But the electric wind is a real current of air, driven from a point either annexed or presented to a body strongly electrified, and with such rapidity, that the direction of it cannot be discerned either with the naked eye, or with the assistance of any glass. *Artificial Electricity*, 1776, p. 331, &c.

POINTS, *Application of the Doctrine of.*—There is not a more important fact in the history of electricity, than the use to which the discovery of the efficacy of pointed bodies was applied.

Dr. Franklin, having ascertained the sameness of electricity and lightning, was immediately led to propose a cheap and easy method of securing buildings from the damage of lightning, by fixing a pointed metalline rod higher than any part of the building, and communicating with the ground or with the nearest water. See CONDUCTORS.

This contrivance was actually executed in a variety of cases, and has proved an excellent preservative: some few instances, however, having occurred, in which buildings provided with such conductors have been struck and damaged, a controversy arose with regard to their expediency and utility. In this controversy Mr. Wilson has taken the lead, and with him Dr. Musgrave and some few other electricians have concurred in their opposition to elevated and pointed conductors. They allege, that every point, as such, solicits the lightning, and thus contributes not only to increase the quantity of every actual discharge, but also frequently to occasion a discharge where it might not otherwise have happened: whereas, they say, if, instead of pointed conductors, those with blunted terminations were used, they would as effectually answer the purpose of conveying away the lightning safely, without the same tendency to increase or invite it. Accordingly, Mr. Wilson, in a letter to the marquis of Rockingham (*Phil. Trans.* vol. liv. art. 44.), expresses his opinion, that, in order to prevent lightning from doing mischief to high buildings, large magazines, &c. the several buildings should remain as they are at the top, that is, without having any metal above them, either pointed or not, by way of a conductor; but that on the inside of the highest part of such a building, and within a foot or two of the top, it may be proper to fix a rounded bar of metal, and to continue it down along the side of the wall to any kind of moisture in the ground.

On the other hand, it is urged by the advocates for pointed conductors, that points, instead of increasing an actual discharge, prevent a discharge where it would otherwise happen, and that blunted conductors tend to invite the clouds charged with lightning. And it seems to be a certain fact, that though a sharp point will draw off a charge of electricity silently at a much greater distance than

than a knob, yet a knob will be struck with a full explosion or shock, the charge being the same in both cases, at a greater distance than a sharp point.

The efficacy of pointed bodies for preventing a stroke of lightning is ingeniously explained by Dr. Franklin in the following manner: an eye, he says, so situated as to view horizontally the underside of a thunder-cloud, will see it very ragged, with a number of separate fragments or small clouds one under another; the lowest sometimes not far from the earth. These, as so many stepping-stones, assist in conducting a stroke between a cloud and a building. To represent these by an experiment, he directs to take two or three locks of fine loose cotton, and connect one of them with the prime conductor by a fine thread of two inches, another to that, and a third to the second, by like threads, which may be spun out of the same cotton. He then bids us to turn the globe, and says we shall see these locks extending themselves towards the table, as the lower small clouds do towards the earth, but that, on presenting a sharp point, erect under the lowest, it will shrink up to the second, the second up to the first, and all together to the prime conductor, where they will continue as long as the point continues under them. May not, he adds, in like manner, the small electrified clouds, whose equilibrium with the earth is soon restored by the point, rise up to the main body, and by that means occasion so large a vacancy, as that the grand cloud cannot strike in that place. (Letters, p. 121, &c.) Mr. Henly, with a view of determining the question, whether points or knobs are to be preferred for the terminations of conductors, made several experiments, two or three of which it may not be improper to recite. Having placed two of Mr. Canton's electrometers, A and B, insulated, upon stands of sealing-wax about seven inches asunder, and as far from the end of a prime conductor, eighteen inches long, and $1\frac{1}{2}$ inch in diameter, with a ball at each end, $2\frac{1}{2}$ inches in diameter, the diameter of the electrical globe being nine inches; on the top of the box A he placed a wire, projecting three inches from the end of it, and terminated by a ball $\frac{3}{4}$ ths of an inch in diameter: on the top of the box B he placed a sharp-pointed wire, projecting also three inches from its end. After giving the winch five or six turns, the balls hanging from the box A were repelled to the distance of an inch from each other, but those hanging from the box B separated full two inches. Then touching the prime conductor with a finger, the balls at A closed, while those at B remained a full inch asunder: hence he infers, that a sharp point is much better adapted to draw off lightning than a knob of $\frac{3}{4}$ ths of an inch in diameter.

In another experiment he insulated three of his largest jars, containing together about sixteen square feet of coated surface; from the bottom of these jars projected a wire terminated in a ball $\frac{3}{4}$ ths of an inch in diameter; and at the distance of $1\frac{1}{2}$ inch from it, he placed the insulated ball C, on which he brought down the charge of the three jars by his discharging rod, which leaped from thence to the ball in contact with the jars, and discharged them by a loud and full explosion: but the same thing did not happen when he removed the insulated ball only $\frac{1}{4}$ th of an inch farther from the other. He then removed the wire which was terminated by the ball, and placed in its stead another of the same length and diameter, but very nicely tapered to a point: then placing the insulated ball C one inch from the point, he brought down the charge of the three jars as before, which flew upon the point, and melted it a little: the jars were discharged with a loud and full explosion. But having removed the ball C to the distance of $1\frac{1}{4}$ inch

from the point, the charge did not strike it, though much of it was presently drawn off silently by the point, as appeared by the falling of the index of the electrometer. Whence it seems probable, that a conductor terminated by a ball of $\frac{3}{4}$ ths of an inch in diameter, would be in danger of a stroke from a highly electrified cloud at a much greater distance than another with a sharp termination. He also varied this experiment by placing the large copper ball, C, at such a distance from that in contact with the jar, that on bringing down the charge by his discharging rod, it seemed to remain almost undiminished, though the rod was kept in contact with the prime conductor a full minute. Then repeating the experiment with a point instead of a knob, the charge was in a great measure presently drawn off silently.

In another experiment, he suspended a large bullock's bladder gilded with leaf copper by a silken string, at one end of an arm of wood, placed horizontally, and turning freely upon the point of a needle; the bladder was balanced by a leaden weight. In this situation he gave the bladder a strong spark from the knob of a charged bottle, when presenting towards it a brass rod, terminated by a ball, two inches in diameter, he observed that the bladder would come towards it at the distance of three inches; and when it had got within one inch of it, it would throw off its electricity in a full and strong spark, nearly, if not quite as large as that which it had received. But giving it another strong spark, and presenting towards it a pointed wire, he could never perceive that it attended to that, and when it was brought nearly into contact with the bladder, there was no spark at all, scarcely any quantity of electricity remaining in it. This experiment was frequently repeated with the same result. Phil. Trans. vol. lxiv. part ii. art. 18. See *THUNDER-House*.

It has been universally allowed, that in cases where the quantity of electricity with which thunder-clouds are charged is small, or when they move slowly in their passage to and over a building, pointed conductors, which draw off the electrical fluid silently, within the distance at which rounded ends will explode, will gradually exhaust them, and thus contribute to prevent a stroke, and preserve the buildings to which they are annexed.

But it has been said by those that are averse to the use of such conductors, that if clouds of great extent and highly electrified, should be driven with great velocity directly over them, or if a cloud hanging directly over buildings to which they are annexed, suddenly receives a charge by explosion from another cloud at a distance, so as to enable it instantly to strike into the earth, these pointed conductors must take the explosion; on account of their superior readiness to admit electricity at a much greater distance than those that are blunted, and in proportion to the difference of that striking distance, do mischief instead of good: and, therefore, they add, that conductors terminated by sharp points are sometimes advantageous, and at other times prejudicial: and that, as the purpose for which conductors are fixed upon buildings is not to protect them from one particular sort of clouds only, but, if possible, from all, it cannot be adviseable to use that kind of conductors, which, if they diminish danger on the one hand, will increase it on the other. Besides, it is pleaded, that if sharp-pointed conductors are attended with any the slightest degree of danger, that danger must be considerably augmented by carrying them high up into the air, by fixing them upon every angle of a building, and making them project in every direction. Such is the reasoning of Dr. Musgrave, for which we must refer to his paper in the Phil. Trans. vol. lxxviii. part ii. art. 36.

POINTS.

Mr. Wilfon, dissenting from the report of a committee of the Royal Society, appointed to inspect the damage done by lightning to the house of the board of ordnance, at Purfleet, in 1777, was led to justify his dissent, and to disparage the use of pointed and elevated conductors, by constructing a magnificent apparatus, with which he might produce effects similar to those that had happened in the case referred to the consideration and decision of the committee.

With this view he prepared a model of the board-house at Purfleet, resembling it as nearly as possible in every essential appendage, and furnished with conductors of different lengths and terminations. As no apparatus sufficiently large for representing a thunder-cloud, could conveniently be put in motion, he contrived to accomplish the same end by moving the model of the building, with a velocity answering to that of the cloud, which he states, at a moderate computation, to be about four or five miles an hour. In order to construct a proper substitute for the cloud, he joined together the broad rims of one hundred and twenty drums, making the surfaces formed by the several junctures even with cloth pasted down, and covering them with tin-foil. These drums formed a cylinder above one hundred and fifty-five feet in length, and above sixteen inches in diameter. The whole cylinder was made in four separate parts, three of which could easily be made to communicate or not with each other; the fourth, consisting of eight brass drums, was reserved for a different purpose. The great cylinder, consisting of the three parts, and containing five hundred and ninety-two square feet, was suspended about five or six feet from the floor by silk lines, one end of it hanging over the middle of the long frame on which the model was proposed to move, and the other being joined occasionally to the end of a wire four thousand eight hundred feet long, that was suspended through the whole space of the room; the remote end of this wire hooked on occasionally at the end of the brass drums, which made a separate cylinder about ten feet in length, and which was suspended by silk lines about six feet from the floor, in such a manner that the farthest end thereof from the wire was within nine or ten feet from the great cylinder. The long wire with the great cylinder and brass drums made the whole of the substitute for a thunder-cloud, when they were properly charged. This apparatus was charged by a machine with one glass cylinder, about ten or eleven feet from its nearest end. The whole of the apparatus was disposed in the great room of the Pantheon, and was applied to use in no less than fifty different experiments.

It is impossible within the limits of this article to do justice to Mr. Wilfon's experiments, or to the inferences which he deduces from them. It will be sufficient to observe in general, that most of his experiments, in which the model of the house, with pointed or blunted conductors annexed to it at the same or different heights, and made to move swiftly under his large artificial cloud, were intended to shew, that conductors with points are struck at a greater distance, and with a higher elevation than those with blunt or rounded terminations; and from all his experiments made with pointed and rounded conductors (provided the circumstances be the same in both) he infers that the rounded ones are much the safer of the two; whether the lightning proceeds from one or more clouds; that those are still more safe which (instead of being, as Dr. Franklin recommends, ten feet high) are very little, if at all, above the highest part of the building itself; and that this safety arises from the greater resistance exerted at the larger surface. For a farther account of the apparatus, experiments, and reasoning of Mr.

Wilfon, the reader, desirous of more particular information, is referred to the Phil. Transf. vol. lxxviii. part i. art. 15.

The committee of the Royal Society, composed of nine of the most distinguished electricians in this kingdom, to whom the consideration of the most effectual method of securing the powder-magazines at Purfleet, against the effects of lightning, was referred, express their united opinion, that elevated rods, constructed and disposed in the manner which they direct, are preferable to low conductors terminated in rounded ends, knobs, or balls of metal, and that the experiments and reasons, made and alleged to the contrary by Mr. Wilfon, are inconclusive.

Mr. Nairne, in order to obviate the objections of Mr. Wilfon and others, and to vindicate the preference generally given to elevated and pointed conductors, constructed a much more simple apparatus than that of Mr. Wilfon, with which he made twenty-seven well-designed and well-conducted experiments, which seem to prove the point as far as it is capable of being proved by our artificial electrical apparatus. Of these, as the subject is of importance, it will be proper to give some account. His apparatus and machine were as follow, and will be sufficiently understood from the description of them. A is a glass cylinder eighteen inches in diameter, B a conductor of wood, covered with tin-foil, six feet long, and one foot in diameter, and intended to represent a cloud, and D a brass rod on a stand communicating with the earth, to the end of which other rods, terminated with balls of a different size, or a point, might be screwed, and designed to represent a conductor to a house. A brass ball, four inches in diameter, being screwed on to the end of the rod D, was struck by the ball C, at the end of the charged conductor to the distance of seventeen inches and four-tenths, and sometimes to nineteen, and even to twenty inches; a ball, one inch in diameter, received strokes to the distance of about two inches, which were succeeded by a hissing noise, and a continued light on the ball, till the distance was about ten inches; after which the strokes were renewed and continued to the distance of $14\frac{8}{10}$ inches, and occasionally to $16\frac{3}{10}$ inches; a ball of $\frac{2}{10}$ ths of an inch diameter, in the same circumstances, was struck to the distance of half an inch, and continued luminous till it was removed beyond the striking distance as far as thirty-three inches. Instead of a ball, a wire about $3\frac{1}{2}$ inches long, terminating in a point, was substituted in its stead, but no strokes happened, though the point was almost in contact with the ball C; at the distance of half a tenth of an inch, the point received a stream of fire; beyond that distance, it was luminous, and so continued whilst it was gradually removed to the distance of six feet.

In another experiment, the ball of four inches in diameter, with a hole through it, was used; through the hole a wire projected $\frac{1}{10}$ th of an inch beyond the surface of the ball, and directly pointing to the ball C; but neither the ball nor point were struck at any distance; the point was luminous at the distance of thirty inches; when the point of the wire was made even with the surface of the ball, it was struck to the distance of $17\frac{1}{4}$ inches. Having screwed a hollow brass ball $3\frac{1}{2}$ inches in diameter, with a hole through it, to a brass hollow stem, and passed a wire through it with its pointed end projecting one inch beyond the surface of the ball; this apparatus was placed on a stand communicating by metal with the earth, at the distance of five feet from the conductor or artificial cloud, and directly opposite to its sides; in this case the striking distance from the ball C to the ball of four inches diameter on the rod D, was $16\frac{1}{10}$ inches; when the point of the wire, passing through the ball and stem, was made to project nine inches beyond it,

the

the striking distance only $6\frac{3}{10}$ inches. In order to discover how far a point or differently sized balls, with small separations in the metallic communication with the earth, would act to carry off the electric fire of the artificial cloud, Mr. Nairne fixed a screw to each end of a stick of sealing-wax, and, having pasted a slip of tin-foil over its surface, and made a separation of the tin-foil of about $\frac{1}{10}$ th of an inch, screwed the pointed wire into one end, and the other end of the wax to the brass rod, where the ball with the point projecting from it was placed in the last experiment. The stand, being placed directly opposite to the side of the artificial cloud, was removed to the distance at which the light between the separation of the tin-foil no longer became visible, which was above seven feet. When a ball of $\frac{3}{10}$ ths of an inch was put in the place of the point, the light was visible at the distance of four feet six inches, but with a ball of three inches diameter, only at two feet. He took another stick of wax, $1\frac{3}{10}$ inch in diameter, and about ten inches long, and, having pasted on it round pieces of tin-foil half an inch in diameter, at about half an inch distance from each other, screwed one end of it to the receiving rod, the pointed wire being screwed into the other end. All the separations of the tin-foil, except two, were connected by a piece of brass laid on the wax, and the point of the wire was placed nearly in contact with the ball; in these circumstances the fire of the charged conductor struck into the point, and continued to strike till it was gradually removed to the distance of $1\frac{1}{10}$ inch; beyond which distance it would not strike, but the point continued luminous to the distance of three feet. When the connecting brass piece was removed, the point was not struck till it was removed to the distance of $4\frac{1}{2}$ inches; it continued to be struck to the distance of ten inches; after which it was not luminous, except when the artificial cloud discharged its electric fire into the air, by a diverging pencil from the ball C.

From the experiments above recited, we may infer, that the artificial cloud strikes at distances greater, as the termination of the conductor is more blunted; that the striking distance is less as the end of the conductor tends more to a point; and that when the end of a conductor is pointed, the point is not struck at any distance, but continues luminous to a certain distance, carrying off silently the electricity of the artificial cloud. We may also infer the utility of a pointed rod, even if it projects but a small distance above the highest part of a building; that a point within the surface of a ball does not prevent the ball being struck; that the more elevated our pointed conductors are, the greater is the chance of preserving buildings from the effects of lightning; that a conductor terminating in a point acts at a much greater distance than one terminating with a ball, in carrying off the electric fire; that the reason why the artificial cloud strikes to the point, is the separation or discontinuance of the metallic part of the conductor; that it strikes farther to the point, as the number of separations is increased; and that, if the metallic communication with the moist earth be completed, the charged cloud will not strike to the point.

Another part of Mr. Nairne's apparatus is a moveable artificial cloud, consisting of a hollow tube of wood, with a ball at each end, about six feet in length; from the ends are suspended hollow wooden cylinders E, E, which, together with the balls and tube, are covered with tin-foil; the axis of the tube rests on two semicircular hollows, in a piece of brass fixed on the glass pillar; round which axis it easily moves, and is brought to a horizontal position by means of two moveable pieces F, F. Having put this moveable cloud into an horizontal position, and the brass on which the

axis rested into contact with the end of the artificial cloud B, under each of the hollow cylinders E, E, Mr. Nairne placed stands, G, G, having a good metallic communication with the earth, one of which was furnished with a pointed wire, and the other with a brass ball, three inches in diameter. Each of these was placed twelve inches from the bottom of its corresponding cylinder; and when the clouds were charged the point became luminous, and the moveable cloud remained in a horizontal position; but when the operation of charging the two clouds was discontinued, it was immediately found, that the point had drawn off almost all the electric fire. When the clouds were again charged, and the stand with the ball removed, the point was luminous, and the moveable cloud remained horizontal, not being attracted to the point which carried off the electric fire. But when the clouds were charged, the stand with the ball restored, and that with the pointed wire removed, the end over the ball was attracted down till it came to its striking distance, where it discharged its electricity on the ball in a strong spark. It then receded a little, and being charged, approached the ball as before, and discharged its electricity at once, and thus continued striking and receding as long as the two clouds were charged. When the pointed wire was replaced, it became luminous, the striking ceased, and the moveable cloud returned to its horizontal position. The effect was the same, when the pointed wire was placed on the same side with the ball. The conclusions from these experiments are obvious. From these experiments, in which the moveable artificial cloud was made to represent a cloud in its natural state receiving electric fire from a charged cloud, it was found, that the point deprived it of its electric fire which it received from the charged one so fast, that the artificial cloud could keep constantly striking to the other end, without repelling it from it: but that, when the ball was placed in the room of the point, instead of the artificial cloud continuing to strike to the other end, without repelling that end, it now first attracted and charged it with electricity, then immediately repelled it; and being attracted by the ball under the other end, it moved down with an increasing velocity, till it came within its striking distance, when it discharged its electricity on the ball with a loud and strong spark, and so continued alternately receiving and discharging its electric fire on the ball, according to the known laws of electricity. In another experiment it was found, that, though the moveable artificial cloud was in great motion, receiving and discharging its electric fire on the ball, on taking away the ball, and putting the point in its place, the artificial storm immediately ceased. When the cloud is fixed at a certain distance between the artificial cloud and the point, the fixed cloud, at the instant it receives the electric spark, directly discharges it again on the point; but without any other alteration, besides making the cloud moveable on its axis, the distances being the same, the end of the cloud then recedes from the point, and will not strike to it; and this case is much more agreeable to nature than the other, because clouds are not fixed but floating bodies.

In order to observe the effects of rods terminating with balls of different sizes, or terminating with a point moving swiftly under the artificial cloud, Mr. Nairne made use of an apparatus, in which H is a hollow tube of wood, covered with tin-foil, with a heavy weight fastened to one end of the tube, suspended by an axis, about three inches above the weight, between two wooden pillars: in this wooden tube there was a moveable brass rod, by means of which a ball, or point, fixed on it, might be raised to any required height. To the under part of the artificial cloud, at K, was fixed a ball $1\frac{3}{10}$ ths of an inch in diameter; and then the apparatus

ratus was placed under it with a point, the swinging rod being held down to the floor, and the point covered; the artificial cloud was then charged, and the swinging rod with the point being let go, passed swiftly and very near to the ball under the artificial cloud at K. This was repeated several times, till the greatest striking distance to the point was found, which was generally $\frac{1}{10}$ of an inch. Instead of the point, a ball $\frac{3}{16}$ ths of an inch in diameter was applied in the same manner, and the striking distance was generally found to be $2\frac{1}{16}$ inches. When a ball of $\frac{1}{16}$ ths of an inch was used, the striking distance was generally fifteen inches. Here we may observe, that the singular disappearance and re-appearance of the sparks, on gradually removing the small conductor from the prime conductor, already mentioned, occurred likewise in the two first of the cases just recited; but when the large ball was used, it was struck uninterruptedly till it was removed to the distance of sixteen inches. From these last experiments it appears, that the point is struck by means of a swift motion, but that the ball of $\frac{1}{16}$ ths of an inch was struck farther than the point, and the larger ball at a much greater distance than either, even with the swiftest motion. Upon the whole, Mr. Nairne seems to be justified in preferring elevated pointed conductors; next to them those that are pointed, though they project but a little distance above the highest part of a building; and after them those terminating in a ball, and placed even with the highest part of a building. For a farther account of these curious and useful experiments, and the author's remarks on those of Mr. Wilson, the reader is referred to Phil. Trans. vol. lxviii. part. ii. art. 37.

POINT, in *Geometry*, according to Euclid, is a quantity which has no parts, or which is indivisible.

Wolfius defines it, that which terminates itself on every side; or which has no terms or boundaries distinct from itself.

This is what we otherwise call the *mathematical* point, and is only conceived by the imagination; yet it is in this that all magnitude begins and ends, the flux or motion of the point generating a line, that of a line a surface, &c.

Hence some define a point to be the inceptive of magnitude.

Hobbes defines a point to be a body whose magnitude is not considered. But his false notions of a point, line, and surface, have led him into many errors. Monsieur de Crouzas also has supposed a line to be composed of points, in his geometry and comment on the *Analyse des Infiniment petits*. This supposition only tends to confound learners. See Jo. Bernouilli *Oper.* vol. iv. p. 161, seq.

A line can only cut another line in a point. Any three points being given out of a right line, a circle, or part of a circle may be drawn, that shall pass through them all.

To draw a parallel line, a perpendicular, a tangent, &c. to a given point, are popular problems in geometry. See PERPENDICULAR, PARALLEL, TANGENT, &c.

POINT, *Conjugate*, is used for that point into which the conjugate oval, belonging to some kinds of curves, vanishes. Maclaur. *Algebr.* p. 308.

POINTS, *Proportion of Mathematical*. It is a current maxim that all infinites, whether infinitely great, or infinitely small, are equal; yet is the maxim false in both cases. Dr. Halley shews several infinite quantities, which are in a finite proportion to each other; and some infinitely greater than others. See INFINITE *Quantities*.

The like the Hon. Mr. Roberts shews of infinitely small quantities, viz. mathematical points.

He demonstrates, for instance, that the points of contact between circles and their tangents, are in a subduplicate proportion.

portion to the diameters of the circles; that the point of contact between a sphere and a plane is infinitely greater than that between a circle and a tangent; and that the point of contact in spheres of different magnitudes are to each other as the diameters of the spheres.

POINT of *contrary Flexure*, in the *Higher Geometry*. See POINT of INFLECTION, and RETROGRADATION of Curves.

POINT of *Reflection*, in *Geometry*, is commonly used instead of point of retrogradation, or retrogression.

POINT, in *Grammar*, is a character used to mark the divisions of a discourse.

The point *proper* is what we otherwise call a *full stop*, or period, and serves to denote the sense complete, and the period ended. See PAUSE.

Two points usually mark the middle of a period, and shew a construction complete, and the sense to be perfect; yet intimating something to come after it; this we call a colon.

A point with a comma, called a semicolon, marks a sense less complete than the colon: though authors seem to use them indifferently; nor are grammarians agreed about their precise difference.

The comma, or virgula, marks a subdivision of a member of a period. To these points Dr. Ward adds the semi-period.

Besides these primary points, which distinguish sentences, there are others, which Dr. Ward calls *notæ affectuum*, and which, Dr. Lowth says, denote a different modulation of the voice in correspondence with the sense: such are a point of interrogation (?), which marks something to be pronounced in a higher tone, as intimating a question asked; a point of admiration, or exclamation, (!), which marks a sudden surprize and wondering; and a parenthesis.

The interrogation and exclamation points are indeterminate as to their quantity or time, and may be equivalent in that respect to a semicolon, a colon, or a period, as the sense requires; they mark an elevation of the voice.

The parenthesis, which incloses in the body of a sentence a member inserted into it, which is neither necessary to the sense, nor at all affects the construction, marks a moderate depression of the voice with a pause greater than a comma.

Our points and accents were entirely unknown to the ancients. In the ancient Greek manuscripts, the whole discourse seems written with the same stroke of the pen; the words and letters being joined throughout.

In after-times, points were invented, and added at the top of the letters, to shew when the sense was finished. Hence the grammarians, coming to retouch the old manuscripts, thought fit to add the points and accents. Salmasius affirms, that he has even observed plainly where they have been added, by the difference of hands. See PUNCTUATION.

POINTS, or *vowel Points*, in the *Hebrew Learning*, are certain characters, which, in the writings of that language, serve to mark the vowels.

The antiquity of the points in the Hebrew tongue makes the subject of a celebrated controversy among the learned; some maintaining their origin to be the same with that of the Hebrew language; and others asserting them to have been first introduced by Ezra, after the Babylonish captivity, when he compiled the canon, transcribed the books into the present Chaldee character, and restored the purity of the Hebrew text.

Others will have them invented by the doctors of the school of Tiberias, usually called the Masorites, about 500 years after Christ. The rabbin Elias Levita was the first who started this question, in the beginning of the 16th century; and maintained them to have been an invention of the

Maforites, for the ease of those who were to learn the Hebrew tongue. See MASORA.

This sentiment was espoused by Capellus, to whom also adhered Luther, Calvin, Casaubon, Scaliger, Masclef, Erpenius, Mercer, Morinus, Drufius, Le Clerc, Walton, Hare, Bently, Newton, Sharp, &c. who are all opposers of the antiquity of vowel points. To these we might add several of the Jews, particularly Aben Ezra, who lived in the twelfth century: and almost all the learned men of the Romish persuasion. Buxtorf attacked Capellus violently on this article, and gained a great number of divines on his side, who took the alarm, imagining it a grievous wound to the holy text, to allow the vowel points to have been added by the Maforites, and not to have been found in the ancient text; because, without these, it is very difficult to fix the certain reading thereof. Yet, in the Samaritan text, there is no point or vowel, nor in many of the most ancient Hebrew manuscripts.

Those who maintain that the Hebrew points were not invented by the Maforites, allege, that there is no mention in any Jewish writer of such an alteration; as the introduction of the points, being made in the Hebrew Bible; that all the annotations or notes of the Maforites upon the vowels, relate to the irregularity of them, which could not have been occasioned by themselves, but must have existed in the copies that were before them; that express mention of the points or vowels occurs in books more ancient than the Talmud, *viz.* Babir and Zoar, the first said to be written a little before our Saviour's time, and the second about a century later. However, these books are justly rejected by others as spurious. Prideaux says, that many particulars occur in these books, which prove that they must have been written above a thousand years after the pretended time of their composition; and farther it is pleaded, that the points were in use in our Saviour's time, from Mat. v. 18, whence it appears, that the titles or points at that time belonged to the law. But Capel understands by the *קטנות*, not the points, but the corollæ or flourishes made about the Hebrew consonants.

Those who are of opinion that the points are coeval with the consonants, argue, that it is impossible to pronounce the language without vowels, and also to teach it, unless the vowels were expressed; that if the vowels are of human and late invention, the authority of the holy scriptures will be weakened, and the sacred text left to an arbitrary and uncertain reading and interpretation. But to this objection it is replied, that א, ה, ו, י, and יו, originally served for vowels. Nevertheless, this answer seems insufficient; because there are many words in which these letters do not occur; and it is argued, from the nature and structure of the Hebrew language, and its dialects, in which the radicals or primitive words are formed by triads, composed by the conjunction of different consonants or letters, that some other letters must necessarily belong to the language. However, it is certain, that the *matres lectionis*, as the above letters are called, have been sometimes omitted; for they are more frequent in some of the older manuscripts than in the later, or in the printed text.

The arguments against the antiquity of the Hebrew points, tending to prove that they were added by the Maforites, are deduced from grammar, testimony, and history. The grammatical arguments are principally founded in the Keri and Chetibh. The Keri, it is agreed, began to be collected a little before the completion of the Talmud, probably by the Maforites; and it is observed, that they are various lections merely of the consonants, and not of the vowel points; and that there are certain irregularities in the

punctuation, both with respect to whole words, and the parts of words, which shew that the points were not in the copies, from whence the Keri and Chetibh were made.

The testimony which furnishes the second class of arguments is either express or tacit. Of the first sort is the testimony of Aben Ezra, R. David Kimchi, R. Jehuda Levita, and R. Elias Levita, who deny the antiquity of the vowel points. The tacit testimony is derived from the copies of the law, which are kept and read in the synagogues, or from the cabbalistic interpretation, or from passages of the Talmud. Those copies of the law called *Sepher-torah*, read every Sabbath, and reckoned the most sacred, are constantly written without points; to which we may add, that in many manuscripts, examined by Dr. Kennicott, and those some of the oldest and best, either there are no points at all, or they are evidently a late addition. The cabbalistic interpretations relate to the consonants, and none of them to the vowels. When the Talmud was composed, the points were not affixed to the text, because there are several disputes concerning the sense of the passages of the law, which could not have been disputed, if there had been points; besides, the vowels are never mentioned, where the fairest opportunity occurred for mentioning them, if they had been in being.

The arguments from history are drawn from the Chaldee paraphrases of Jonathan and Onkelos, the Greek versions of Aquila, Symmachus, and Theodotion, and especially that of the Septuagint; whence it is argued, that the copy from which these were translated was without points; as several words are translated in a different sense from that which the points would determine them to mean. Those who wish to see a compendious abstract of the arguments for and against the antiquity of points, and of the state of this controversy, may consult Jennings's *Jewish Antiq.*, vol. ii. p. 344, &c.

Dr. Prideaux has an hypothesis peculiar to himself: he apprehends that the points were added by more ancient Maforites than those of the school of Tiberias, soon after Ezra, when the Hebrew ceased to be a living language; but that they were not in common use, nor taught in the theological schools, till after the compilation of the Talmud. *Conn. part i. book v. vol. i. p. 5—520. ed. 10.*

POINTS, in *Heraldry*, are divisions of the escutcheon into several squares, sometimes to the number of 9, sometimes to 15; some of which are of one colour or metal, the others of another; called also *equipollent* points.

There is also another, and that more frequent division of the escutcheon into points, which have several names and values, according to their several places.

There are nine principal points in an escutcheon, described under ESCUTCHEON.

Columbiere makes the points, and their situations, symbolical. As the several bearings in an escutcheon are so many types representing the commendable actions of the person they are given to; so the escutcheon itself represents the body of the man that performed them; and the points or parts signified by these letters, the principal parts of his body. Thus, A, B, C, represent the head, in which the three great faculties reside; D, the neck, where ornaments are chiefly borne; E, the heart, &c.

POINT is also the name of an ordinary, something like the pile, rising frequently from the bottom of the escutcheon to the top, very narrow, and only taking up two-thirds of the point of the escutcheon.

When the point arises from the base, it is peculiarly called *point-in-point*.

POINT *inverted*, is when it descends from the chief downwards;

wards; possessing two-thirds of the chief, but diminishing as it approaches the point of the escutcheon, though without touching it.

POINT in Bend, or Point in Bar, is when the point is placed transverse in the situation of a bend or bar.

When it comes from the sides of the escutcheon, it is also called a point *dexter* or *sinister*, according to its situation.

The *point dexter* is commonly reputed an abatement due to a braggadocio. *Point champion ten* due for killing a prisoner after quarter demanded. *Point-in-point*, a diminution belonging to a coward. *Point-plane*, an abatement belonging to a liar, &c. See DIMINUTION.

POINT is also used in heraldry for the lowest part of the escutcheon, which usually terminates in a point.

POINT Champain. See CHAMPAIN.

In the French arms, the fleur-de-lis are two in chief, and one in point.

POINT, in the Manege. A horse is said to make a point, when in working upon volts, he does not observe the round regularly, but pulling a little out of his ordinary ground, makes a sort of angle or point by his circular tread. This fault is prevented by hastening the hand. See HASTE.

POINT is also used to denote the toes of a bow of a fiddle.

POINT, in the Manufactories, is a general term used for all kinds of laces wrought with the needle.

Such are *point de Venice*, *point de France*, *point de Genoa*, &c., which are distinguished by the particular economy and arrangement of their points.

POINT is sometimes also used for lace woven with bobbins, as *English point*, *point de Molines*, *point de Havre*, &c.

POINT is also an iron or steel instrument, used, with some variety, in several arts.

Engravers, etchers, cutters in wood, stone-cutters, &c., use points to trace their designs on the copper, wood, stone, &c.

Statuaries, &c. have likewise points in manner of little chisels, used in the first forming or sketching out their work.

Turners work or fashion their common works between two points fastened to the puppets. Lapidaries have also iron points, to the ends of which are fastened pieces of diamonds, serving to pierce the precious stones.

POINT, in Music, is a mark or note anciently used to distinguish the tones.

Hence we still call it simple *counter-point*, when a note of the bass answers precisely to that of the treble; and figurative *counter-point*, when a note is syncopated, and one of the parts makes several inflexions of the voice or tone, while the other only makes one.

We still use a point to raise the value of the note, and prolong its time by one half; *e. gr.* a point, added to a semibreve, makes it, instead of two minims, equal to three.

In the old music, a point added to a *binary* note, or one that was only equal to two others of any kind, was called the *point of perfection*, as triple time was then called *perfect*, and common time *imperfect*.

A point, in the art of fugue, generally implies a new subject of imitation in a regular fugue, and resembles an episode in an epic poem.

The Italians call the principal theme of a fugue *foggetto*, subject, as we do; but a new point is by them generally termed *attacco*; which see.

POINT d'Orgue, Fr., or Point de Repos, is a pause \frown upon a note in the base, equivalent to *tasto solo* in Italian music; when the treble part, as in Corelli's solos, is al-

lowed to wander about in double or single stops, after the manner of a cadenza or close, till the terminating shake preceding the final note. A point covered with a semicircle over any note, simply implies a pause; and over the last note of a movement, it implies its final termination. See CORONA.

POINTS, whether ever used in the Greek language as musical notes, see NOTATION.

POINT, in Navigation and Geography. *Points of the horizon, or of the compass,* are certain points, formed by the interfections of the horizon by vertical circles.

The number of these points, therefore, is really the same with that of the points conceived in the horizon, *i. e.* infinite; though, in practice, we only distinguish thirty-two of them.

Some use point for the interfection of a vertical circle, with a circle parallel to the horizon; and even some, for the segment of a vertical, intercepted between the meridian and horizon, or a circle parallel thereto.

The points are shewn by right lines drawn from a point assumed in a horizontal plane.

A point of the compass is popularly taken for a 32d part of the whole; or for an arc of $11^{\circ} 15'$; half of which, *viz.* $5^{\circ} 37\frac{1}{2}'$, is called a *half* point; and half of that, or $2^{\circ} 48\frac{3}{4}'$, a *quarter* point.

These points of the compass are divided into *cardinal* and *collateral*; which see. See also COMPASS.

POINT, in Optics. The point of *concourse*, or *concurrence*, is that wherein converging rays meet, more usually called the *focus*.

POINT of Dispersion. See DISPERSION.

POINT of Incidence. See INCIDENCE.

POINT of Reflexion. See REFLEXION.

POINT of Refraction. See REFRACTION.

POINT, Radiant. See RADIANT.

POINT, in Perspective, is a term used for various parts or places, with regard to the perspective plane. Such are the

POINT of Sight, or of the Eye. This is a point on a plane, marked out by a right line drawn from the eye, perpendicular to the plane. This is also called the *principal* point.

This point is in the interfection of the horizontal and vertical planes.

Some authors call this the *principal* point; and give the name *point of sight*, or *vision*, to the point in which the eye is actually placed, and where all the rays terminate. See PERSPECTIVE, and POINT of View.

POINT of Distance, is a point in the horizontal line, at the same distance from the principal point, as the eye is from the same. See PERSPECTIVE.

POINT, Third, is a point taken at discretion in the line of distance, wherein all the diagonals, drawn from the divisions of the geometrical plane, concur.

POINT, Objective, a point on a geometrical plane, whose representation is required on the perspective plane.

POINT, Accidental. See ACCIDENTAL.

POINT, Visual. See VISUAL.

POINT of View, with regard to *Building, Painting, &c.* is a point at a certain distance from a building, or other object, in which the eye has the most advantageous view or prospect of the same.

This point is usually at a distance equal to the height of the building. For an instance: to consider with judgment the whole of the famous church of the invalids at Paris, we must not stand at above three hundred and forty feet distance from it, which is nearly its height.

To be able to judge of the ordonnance of its façade or frontispiece, and the regularity of its order, the eye should only be as far off as the frontispiece is high; *viz.* a hundred feet.

But to examine the correctness of its profiles, and the spirit of its ornaments, the eye should only be distant the height of the Doric order, which is about forty feet; if it be nearer, the parts, being too much shortened, will appear out of proportion.

A vague or indeterminate point has a different effect from the point of view; in that, in looking at a building from an indeterminate point, the eye can only form an idea of the magnitude of its mass, by comparing it with other buildings adjacent to it.

POINT, *Punctum*, in *Physics*, is the smallest or least sensible object of sight, marked with a pen, point of a compass, or the like.

This is what we popularly call a *physical* point, which in reality has parts, though those parts are not here regarded. Of such points does all physical magnitude consist.

This *physical* point coincides with what Mr. Locke calls the point *sensible*, and which he defines to be the least particle of matter, or space, we can discern. He adds, that, to the sharpest eye, this is seldom less than thirty seconds of a circle, of which the eye is the centre.

POINT, in *Poetry*, denotes a brisk lively turn or conceit, usually found or expected at the turn of an epigram.

POINT, among *Sportsmen*, denotes the position of a *pointer*, when he stands seemingly fixed and immovable at the game before him: at the moment of observing which, particularly with young and unsteady dogs, the sportsman exclaims, "To-Ho;" "Have a Care!" as an injunction of steadiness to the dog that is standing, and of attention on the part of every dog in the field to the first who has observed the point.

POINT, among *Seamen*, is also used for a cape, or headland, jutting out into the sea.

They say, two points of land are *one in another*, when they are so in a right line against each other, as that the innermost is hindered from being seen by the outermost.

POINTS, in *Rigging*, are short pieces of braided cordage, plaited together as gaskets are; beginning in the middle with nine foxes, and tapering to five at the ends, and from one and a half fathom to one fathom in length. They are used to reef the courses and top-sails.

POINTS of *Cattle*, in *Rural Economy*, the parts which shew the excellencies or defects in their forms. See CATTLE.

POINT, in *Geography*, is used for *Cape*, (which see.) The principal points of this kind occur under the appellations that distinguish them, or from which they are denominated. Our limits will not allow our reciting them in this place.

POINT-BLANK, in *Gunnery*, denotes the shot of a gun levelled horizontally, without either mounting or sinking the muzzle of the piece.

In shooting point-blank, the shot or bullet is supposed to go directly forward in a straight line to the mark; and not to move in a curve, as bombs and highly elevated random-shots do.

When a piece stands upon a level plane, and is laid level, the distance between the piece and the point where the shot touches the ground first, is called the point-blank range of that piece; but as the same piece ranges more or less, according to a greater or less charge, the point-blank range is taken from that of a piece loaded with such a

charge as is commonly used in action. It is, therefore, necessary that these ranges of all pieces should be known, since the gunner judges from thence what elevation he is to give to his pieces, when he is either farther from or nearer to the object to be fired at; and this he can do pretty nearly by sight, after considerable practice. See *Pointing of a GUN*.

POINTED ARCHITECTURE, the appropriate term of a style of architecture of peculiar beauty and solemn effect, particularly in religious buildings, vulgarly called Gothic architecture. The distinctive character of this style is, that all its arches are pointed at the top, while other arches form the segment of a circle. From this peculiarity (the happy effect of intersecting circular arches) progressively grew the slender and circular columns, the aspiring pediments, the lofty steeples, the foliated finials and crockets, the flying buttresses, the meeting groins, the luxuriant tabernacles and the diversified tracery, which characterise the pointed style of architecture. It made its first appearance in England, then the richest and most polished kingdom in Europe, before the middle of the twelfth century, namely, about 1130, and very soon afterwards it found its way into the northern provinces of France, and into Scotland. It is divided into three orders, which grew up at different periods, each being richer and more complicated than the preceding one. See *GOthic Architecture*.

POINTED *Cross*, among *Heralds*, is that which has the extremities turned off into points by straight lines. Columbiere calls it *aiguise*, q. d. *sharpened*.

POINTED *Crowns*. See CROWN.

POINTED *Roof*. See ROOF.

POINTER, SPANISH. See DOG.

Pointers, forty or fifty years ago, were hardly ever seen that were not either entirely white, or variegated with liver-coloured spots; those of the then duke of Kingston's black and white excepted, which were considered as superior to every breed in the kingdom. But they are now to be seen of every description, from pure white and a flea-bitten blue or grey, to an universal liver colour, and a perfect black. Sportsmen observe, that in the choice of pointers for general use, that is, for every species of game, it is best to avoid extremes both in size and in speed. Pointers are never considered as complete, unless they are perfectly staunch to "bird," "dog," and "gun;" that is, that they stand singly to a bird or a covey; that one dog *backs* (or points instantaneously likewise) the moment he perceives another dog to *stand*; and lastly, not to stir from his *point*, upon the firing of any gun in company, provided that the game is neither sprung nor started at which he made his original *point*. The art of breaking pointers for the field was formerly thought a very mysterious and difficult business; but the process is now reduced to such simplicity, that a tolerable well-bred pointer-puppy may acquire the principles of his future excellence in the kitchen or parlour of his master, before he is taken into the field. This may be done even with two or three brace together in a large room, or small yard, with no other assistance, besides the alternate words of "To-Ho," "Take Heed," and "Have a Care;" with the small field whip in hand to impress attention, although meat should be tossed before them in every direction; when a single dog will not stir till the signal of "Hie-on" is heard, which they all eagerly obey; but are as instantly stopped at the moment of seizing their meat, by either of the cautions previously mentioned. Young dogs, having thus imbibed the principles upon which they are to act, have nature and their instinctive impulse, to point out their practice when brought

into the field. When brought into the field, they should be taught to traverse every yard of the ground (in proper lengths and at proper distances), so that none be left unbeaten; and this should be done with as few words, and as little noise, as possible. Short verbal signals, low vibrative whistles, and the motion of the hand to the right or left, are all that are useful; more will do mischief. One steady shot of this description, with a brace of pointers obedient to command, and staunch to *dog* and *gun*, will kill more game in any country, than a noisy crew with three or four brace of dogs before them. Young pointers should not be permitted to deviate from the proper rule of quartering the ground before them; that is, to cover a line of 80 yards *transversely* in the front of his master, taking 40 yards to his right, and repassing him, at the same distance to the left; and in such proportions as not to let his crossings and recrossings be more than 25 or 30 yards from each other. If a brace of pointers are in the field, they should alternately cross the same beat, by *meeting* and *passing* each other; but never beat the same way in a parallel direction.

Those who wish pointers to bring the game when killed, will find it easy of attainment, by teaching them to fetch and carry before they take the field. Previously to the beginning of the season, or about a fortnight before its commencement, each dog should have two doses of physic about four days apart; after which proper attention should be paid to the provision, which should be of a sweet and healthy kind, to preserve their organs and faculties, as much as possible, in full perfection. From the hardness and heat of the ground in the first weeks of September, it sometimes happens, that the feet become lacerated, inflamed, and sore; in which case, plentiful washing, with warm gruel and a sponge, will afford considerable relief; and in an hour or two afterwards, the application of some weak salt and water, or old white wine vinegar, will harden the surface, and probably prevent a repetition of the grievance.

POINTERS, in *Ship Building*, are braces of oak timber of a large scantling, sometimes fixed diagonally across the hold, to support the sides and beams to which they are attached by iron-straps or knees.

POINTING, PUNCTUATION, in *Grammar*. See PUNCTUATION.

POINTING, among *Seamen*, the marking on the chart in what point or place the vessel is.

All the difficulty in pointing a chart arises from our ignorance of the longitude. The pilot easily finds the latitude, by taking the height of the pole; but, for the longitude, there is no coming at it but by computation, which is always uncertain.

POINTING, in *Rigging*, tapering the end of a rope, or splice, and working over the reduced part a small close netting, with an even number of knittles twisted from the same, to prevent the end untwisting, and to go more readily through a block or hole. The ends of the strands of a cable are occasionally pointed, for the greater conveniency of splicing it to another cable.

POINTING, in *War*, the levelling or directing of a cannon, or mortar-piece, so as to play against any certain point. See *Pointing of a Gun*, and *GUNNER'S QUADRANT*.

POINTY, in *Geography*, a town of Hindoostan, in Bengal, on the side of the Ganges; 30 miles N.N.W. of Rajemal. N. lat. 25° 19'. E. long. 87° 33'.

POINTYPOUR, a town of Hindoostan, in Oude; 30 miles S.E. of Fyzabad.

POJO, a town of Sweden, in Nyland; nine miles N. of Eknas.

POIREL'-*fous-la-Roche*, a town of France, in the department of the Vendée, and chief place of a canton, in the district of Montaign; six miles N.N.W. of La Roche-sur-Yon. The place contains 1900, and the canton 9423 inhabitants, on a territory of 295 kilometres, in eight communes.

POIRETIA, in *Botany*, a genus established by the late M. Ventenat, received that appellation in honour of his countryman M. Poiret, who travelled into Barbary in 1785 and 1786. An account of that journey appeared in 1789. This gentleman has long been laboriously engaged, as the successor of the distinguished Lamarck, in the botanical part of the *Encyclopedie*, or *Dictionnaire de Botanique*. Other genera have borne the name of *Poiretia*. One of them, so called by Cavanilles in his *Icones* v. 4. 24, had previously been published as *Sprengelia*. Another, printed by the writer of the present article, in *Transf. of Linn. Soc.* v. 9. 304, being, in like manner, posterior to the *Poiretia* of Ventenat, has received, from Mr. Aiton and Mr. Brown, the name of *Hovea*, *Ait. Hort. Kew.* v. 4. 275; which is confirmed by Dr. Sims, in *Curt. Mag.* v. 39. 1624; and serves to commemorate a Polish travelling botanist, Anthony Pantaleon Hove, long employed to collect plants for the Kew garden and Sir Joseph Banks. The following account of the now received *Poiretia*, was transmitted to us by Mr. Brown. *Venten. Mem. de l'Institut* for 1807, part i. 4. —Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Eff. Ch. Calyx bell-shaped, two-lipped; the upper lip emarginate; lower with three teeth. Standard semiorbicular, emarginate, bent back by the keel, reflexed at the sides. Wings oblong, very obtuse. Keel sickle-shaped, curved upwards. Stamens all united. Stigma capitate. Legume compressed, jointed; its joints single-seeded, separating when ripe.

1. *P. scandens*. Climbing *Poiretia*. (Glycine; Lamarck *Illustr.* t. 609. f. 2, without any description.)—This is a native of Hispaniola, and appears to be the only known species.—The *stem* is twining. *Leaves* abruptly pinnate, of two pair of wedge-shaped, or somewhat orbiculate, leaflets, full of pellucid dots. *Stipulas* awl-shaped, distinct from the *footstalks*. *Clusters* axillary, of a few small yellow bracteated *flowers*, dotted like the leaves. *Stamens* sometimes but eight. As this plant is so little known, and hitherto adopted by no one, Dr. Sims expresses his reluctance at yielding up the *Poiretia* of the Linnæan Transactions; but we agree with him that less confusion is likely to arise from this measure than the contrary. It is of no consequence, which particular genus bears the name of one botanist or the other. If our name had been an expressive or classical one, we should in such a case have strenuously contended for it, as we do in the case of *CONCIUM*, (see that article); because sense and utility ought surely to be preferred to a right of priority, which is obscure, unconfirmed, or even unknown. If such a right were absolutely to prevail, we could rake up obsolete authorities to overset abundance of names, now supposed to stand on the firmest possible foundation. This recalls to our memory another *Poiretia*, that of Gmelin, the too famous editor of the Linnæan *Systema Naturæ*. One of the anonymous genera of Walter's *Flora Caroliniana*, of which Gmelin knew nothing, was called by him *Poiretia*, nor did he dream that it was actually the original *Houstonia* of Linnæus! See *Pursh*, v. 1. 106. The authority of such a compiler is, by common consent amongst scientific botanists, reckoned as nothing; for those only who have seen and ascertained plants can have any pretensions to name them.

POIRINO, in *Geography*, a town of France, in the department of the Po; eight miles N.E. of Carmagnola.

POIS, ST., a town of France, in the department of the Channel, and chief place of a canton, in the district of Mortain. The place contains 608, and the canton 6640 inhabitants, on a territory of 105 kilometres, in 10 communes.

POISE. See COUNTERPOISE and WATERPOISE.

POISON, in *Medicine*, any thing which, whether taken into the stomach or lungs, or introduced by means of a wound, proves deleterious or fatal to animal life.

The smallness of the quantity in which these deleterious substances operate upon the living body, and a certain obscurity in their action or mode of operation, perhaps also enter into the notion of a poison. (See the word in Johnson.) These, however, are merely relative circumstances; for many of the most fatal poisons become, in fact, the most valuable remedies, and even the most grateful luxuries, by diminishing their quantity, or, which amounts to the same thing, by diluting their strength. Thus opium, henbane, hemlock, and the whole tribe of narcotic vegetables, the mineral acids, the metallic salts of mercury, and even of arsenic, have been brought to the condition of medicines, and constitute the most powerful and salutary agents in the hands of the physician; whilst alcohol or spirit, which is a speedy poison to many animals, and is fatal to man when pure, and taken in sufficient quantity, has constituted the luxury and solace of the human race, in the various modifications of wine, cyder, mead, beer, and other species of spirituous and fermented liquors, from the earliest periods of history. Then as to the obscurity of the action of poisons, it is precisely upon the same ground as the action of medicines in general: we are equally unable to state in what manner mercury cures syphilis, or sulphur removes the itch, as to point out the mode in which poisons influence the living system. Once for all, indeed, it may be here observed, that the hypotheses, which the older authors devised, upon mechanical principles, to account for the destructive influence of poisonous substances, by referring to certain *spicula*, or acrid salts, calculated to disunite the animal fibres, and decompose the fluids, and to certain organical particles or microscopic animalcules, are the mere creations of the fancy, and are totally unsupported by fact and observation. Indeed Dr. Mead, who advanced the former hypothesis, was convinced of its inadequacy to explain the phenomena; and in the later editions of his treatise on poisons, he recanted his opinion. The latter doctrine, which was maintained by Buffon, was one of the illusions of the microscope, and requires no refutation. Of late years, many experimental investigations have been instituted, which have contributed to throw much light on the mode of operation of poisonous substances, or at least to elucidate the parts of the living system through which they act. The extensive researches of Fontana brought many important facts to light in the most satisfactory manner; and the recent experiments of Mr. Brodie have confirmed his facts, and materially extended our knowledge on the subject.

It must be premised, that there are two classes of deleterious substances, which have obtained the denomination of poisons. One of these consists of such as give rise to specific diseases, when introduced into the living body, and have, therefore, been distinguished by the epithet *morbific* poisons, (to use the appellation of Mr. Pearson,) or more generally *morbid* poisons; which last term implies also, that these poisons are generally the result of disease, as well as the cause of disease in others. The poisons to which we allude are those which give rise to hydrophobia, to the

venereal disease, the yaws, itch, small-pox, and various other maladies. At present we have no evidence that these poisons originate in any individuals, except in those who have imbibed some portion of the secretions from persons affected with these maladies: but there is little doubt, that at some period these poisons have had their origin, independently of such communication; and now and then instances of analogous morbid poisons appear in individuals, under particular states of the constitution. These morbid poisons, however, are not the object of the present article; having been treated of under their proper head. (See MORBID *Poison*.) We shall here limit ourselves to the discussion of the other class of *poisons*, simply so called, and which produce speedy death, when a sufficient quantity is introduced.

The impossibility of explaining the action of all poisons upon any single mechanical principle, is obvious from this circumstance, that the same substance, which is a fatal poison to some species of the animal race, is eaten with impunity, nay is the favourite food and wholesome nutriment of others. Plenck observes, that the nux vomica, which is very deleterious to brutes, is injurious to man only in large doses; that aloes is a poison to dogs and foxes; and bitter almonds to cats, foxes, and chickens; that the phellandrium aquaticum is fatal to horses, but is eaten with impunity by oxen; that the doronicum kills dogs, but fattens antelopes, thrushes, and swallows; that the seeds of hemlock are eaten without injury by stares, those of stramonium by pheasants, those of the lolium temulentum by jays, and the roots of henbane by pigs. The cocculus indicus is deleterious to fish and lice, but it is supposed by Dr. Parr to make a salutary ingredient in the best London porter. (See Parr's London Med. Dictionary, art. *Venenum*.) The same writer affirms that a horse can take a dram of arsenic daily, and improve in his coat and condition. Dr. Withering states, that the *œnanthe crocata*, although the whole plant is poisonous to man, and the root a most virulent poison, is eaten by sheep; that the *cicuta aquatica*, one of the rankest of our vegetable poisons, and certainly fatal to cows, is greedily devoured by goats with impunity, and is eaten by horses and sheep with safety; that the *æthusa cynapium*, which is poisonous to geese, and occasions sickness in man, is eaten by cattle, sheep, goats, and swine; that elderflowers are fatal to turkeys, and its berries to poultry; and that the *convolvulus sepium*, which resembles the scammony plant in its acrid purgative qualities, when taken by man, is eaten largely by hogs without any such operation. Many other instances of a similar variation in the effects of the same substance upon different animals might be adduced, if it were necessary to extend the catalogue. See Withering's Botanical Arrangement of British Plants, in the notes, passim; Plenck, *Toxicologia seu Doctrina de Venenis*, p. 10, &c.

Poisons differ from each other in their action, likewise, in other respects. Some of those which are speedily fatal, if introduced into a wound, may be swallowed with impunity; as in the instance of the venom of the viper and other snakes, which appears to exert no influence on the stomach. Others, again, are principally deleterious by their action upon the stomach; such as the strong mineral acids, the caustic alkalies, and other chemical poisons. Whilst others are deleterious, whether applied to the inner surface of the stomach, introduced into the lower intestines, or inserted in a superficial wound; such as the powerful vegetable narcotics, tobacco, and the minerals, arsenic, barytes, &c.

All the three kingdoms of nature are productive of poisons,

sons, of which a complete catalogue has been arranged by professor Plenck, in his treatise entitled *Toxicologia*, above quoted. It may be sufficient, however, in this place, to enumerate some of the more remarkable examples of animal, vegetable, and mineral poisons; to state the phenomena or effects which they produce in the living body; to point out the nature of their action as far as that has been ascertained by experiment and observation; and to mention the antidotes, or means of counteracting their deleterious influence, where any such are known.

1. *Of animal Poisons.*—The animal kingdom furnishes examples of poison only in the classes of serpents, insects, and fishes, and the most virulent of them occur in the former, or serpent tribe. Many of this tribe, however, are not poisonous, such as the *Boa*, *Angues*, *Amphisbena*, and *Cæcilia*: the two genera of *Crotalus*, or rattle-snake, and *Coluber* (which includes the viper, the cobra de capello, the cerastes, &c.) afford the only examples of venomous snakes; nor are all the species of coluber poisonous. Serpents inflict their poison by the bite only; and for this purpose, in addition to the teeth possessed by the rest of the tribe, the poisonous ones are furnished with two or three longer teeth, or fangs, in the upper jaw, which they can extend or retract at pleasure, and which are perforated by a canal opening near their points. Through these apertures the poison is pressed out from a vesicle, or reservoir, at the root of the fangs, in which it is secreted, and is instilled into the wound which is inflicted by the bite. By poisonous insects, however, the venom is frequently inserted from the tail, which is armed with a sting, which, like the fang of the serpent, is perforated to the point, and seated over a reservoir of venom; as in the scorpion, wasp, bee, &c. but by some, as the tarantula, it is inserted by the bite. The poison of insects, even of the scorpion, is generally inflicted in such minute quantity as to be incapable of producing death in man. The sting of the smaller species, as of the wasp, &c., occasions only a local inflammation and swelling, and does not affect the constitution at large; and even the bite of the tarantula spider, respecting which so many fables have been propagated, produces only a painful and livid swelling, which, in a few days, becomes covered with a dark crust, with an occasional sleepiness, oppression about the præcordia, and pains in the joints. See Plenck, loc. cit.

The poison of serpents, however, is often fatal to man, and commonly so to the smaller animals, and has, therefore, been the subject of much interesting inquiry. Upon the more virulent poisons of the several species of rattle-snake, which inhabit America, and of the more deadly species of coluber, which are found on the same continent, and in Asia, few opportunities of making experiments have occurred. It appears, however, that the operation of these poisons is different only in degree from that of the viper, (*Coluber verus*), which, as the principal, or almost only poisonous reptile of Europe, has been the chief subject of experiment. For our knowledge of the nature and operation of the poison of the viper, we are indebted to the industry and zeal of the abbé Fontana, from whose "*Traité sur le Vénin de la Vipère, sur les poisons Américains, &c.*" we extract the following account.

The poison of the viper is a yellow viscid liquor, that flows from the fangs of the reptile when it bites. This poison is neither acid nor alkaline, nor does it contain any peculiar salts, as Mead and others maintained. It possesses no acrimonious quality, so that when it is put upon the tongue or the lips, in its pure state, it excites no sensation of any kind, no heat or pungency, nor any determinate taste, except a slight degree of astringency. In this respect

it differs materially from the venom of the bee, and other insects, which is acrid. The poison of the viper, even when applied to the eyes, excites no pain or inflammation; and it may be swallowed with impunity, as was proved by a servant of Fontana, who took it repeatedly, sometimes pure, and sometimes diluted, in various quantities, without experiencing any sensible effect. A dog also took it, with crumb of bread which had been soaked in it, and appeared to like it; but suffered nothing from its effects. It is obvious, then, that this poison does not act by any chemical or mechanical property, and that it is perfectly harmless when applied to any unbroken surface, either external or internal.

Fontana then proceeded to investigate, by a long series of experiments, the effects of the poison, when applied to various parts of the animal structure, and in various ways; and he found that the operation of the poison is considerably modified by these circumstances. Thus he produced a slight excoriation of the surface of the skin of guinea-pigs and rabbits, so as to make a very small quantity of blood exude, and then applied the poison of the viper to the excoriated parts; some suppuration, followed by an eschar, took place, but no disease ensued, and the animals were soon well from the local symptoms. He then made deeper wounds in the skin, to about half its thickness, and applied the poison; a more considerable suppuration and ulceration occurred; but the animals did not appear to suffer otherwise, continued to eat constantly, and recovered at the end of ten days. In other experiments, in which the skin was completely penetrated, but the muscles below not wounded, the animals (rabbits and guinea-pigs) died after three or four days, in some cases an encysted tumour forming in the bitten part, in others gangrene. The death, in these cases, however, was perhaps rather the consequence of the local disease, than of the action of the poison on the constitution; for Fontana found that in general, "the venom of the viper is not mortal, if it penetrates no farther than the adipose membrane." He likewise proved, that the poison applied to the surface of the muscles, when laid bare by dissection, is entirely harmless; when muscles are slightly wounded, a local inflammation, swelling, lividity, &c. occur, sometimes violently, but seldom fatally. Bites, or application of the poison to the ears, and noses, of animals, are obviously less dangerous than in those parts where the circulation is more abundant and free; and bites in the tendons are not productive of any disease, except as wounds in those parts.

When by a penetrating bite, however, the poison of the viper is inserted in a wound, in a small animal, death follows in a few minutes. The vital powers of the animal are immediately affected, independently of the irritation of a local wound, so that they will fall prostrate instantaneously, as if paralyzed, and some void their urine and excrements immediately, as if their sphincters had also become paralytic at the moment of their being bit. The fatal effect of this poison, as we shall state afterwards, appears to be in proportion to the size of the animal, and the quantity of poison inserted respectively. The great desideratum, then, is, to ascertain in what manner this rapid destruction of the living power is occasioned, or upon what organs this venom exerts its influence, and how it affects them. From the preceding negative conclusions it is to be inferred, that the poison only acts upon the vital powers, when it enters the blood-vessels; and this supposition appears to be amply confirmed by the experiments which have been instituted. The various hypotheses, however, which have been contrived to explain this mode of action, have not been adequate to that purpose, as will be evident on taking a brief view of the most plausible

of

of them, before we proceed to examine the experimental investigation.

It was believed by the chemical physiologists, that the poison, on entering the circulation, occasioned an universal coagulation of the blood, and therefore stopped its course, in a similar manner as acids are believed to coagulate it when introduced at an aperture made in a vein. But Redi and others have shewn that this universal coagulation does not necessarily take place; and the convulsions, vomiting, and death, which the injection of acids is said to produce, are occasioned by the injection of air and other extraneous matters into the blood-vessels. Not to mention, that the qualities of the poison are not acid. Others have supposed that an universal inflammation was excited by the poison. But Fontana justly observes, that the death is too rapid to be ascribed to such a cause; that there is not even feverishness present in all instances; and that no appearances of inflammation have been found after death. As to the opinion of Dr. Mead, that the salts of the poison decompose the blood, and destroy its crasis, the time in which it is effected is entirely adverse to such a supposition, and the existence of such salts is altogether gratuitous. Indeed, as we have already said, Mead ultimately discarded the doctrine, and referred the operation of the poison to the animal spirits, or nervous system. And this, in fact, is the conclusion, which an attention to the phenomena would lead us to deduce. For, to use the words of Fontana, "if we examine the symptoms that this venom produces in animals, we are easily led to believe that a disease of such a nature belongs to the class of diseases which the physicians stile *nervous*. In the course of my experiments, I have seen a pretty large dog fall down motionless, the moment after it had been bitten by two vipers. I at first thought it dead, but at length perceived some little remains of respiration, which was, however, so slight and feeble, that it could scarcely be distinguished. The dog continued in this lethargic state for more than half an hour. I have seen several others thrown by the venom into very violent convulsions. Vomiting, anxiety, and rage, occur very frequently; the motion of the heart is irregular and convulsive, and the arterial system hard and contracted. In short, they die in the midst of the most unequivocal symptoms of spasms and contractions, and, in a word, with the affections that are by the faculty termed *nervous*." Fontana on Poisons, vol. i. pt. iii. chap. 4.

It, therefore, became necessary to ascertain by experiment the actual influence of the poison upon the *nerves* themselves. Fontana made several experiments on the spinal marrow of frogs, which was laid bare, and wounded with a poisoned tooth; but from the difficulty of influencing the cold-blooded animals with the viper's venom, he could not arrive at any satisfactory conclusion. He then made his trials upon the sciatic nerve in rabbits. Having laid bare this nerve with a little dexterous dissection of the integuments, and holding the great glutæus muscle aside, he wounded the nerve in several places with a venomous tooth of the viper. The animal suffered nothing more than what the wound occasioned, and lived seven days. The sciatic nerve of another rabbit was wounded in upwards of twenty places, with the venomous teeth of two vipers. The rabbit scarcely gave any signs of feeling pain, and at the end of twenty-four hours ate, and appeared lively. It died, however, in forty-eight. The nerve was marked here and there with dark red spots; the parts about it were violently inflamed; and the blood in the auricles and heart was black and coagulated. Similar experiments were made on many other rabbits, with similar results. Other applications of

the poison were made to the sciatic nerves of rabbits, after the nerve had been completely divided; in some the poison was applied above, in others below the division, and the same results precisely took place in both these circumstances, as in those in which the nerve was poisoned, but not divided. He then put two ligatures on the same nerves of other rabbits, and wounded the portion between the ligatures with the poisoned teeth, and the same phenomena occurred as in all the preceding experiments; the livid spots in the nerves and adjoining portions of the muscles, and death in the second day, sooner or later. He then made some comparative experiments, by inflicting simple mechanical wounds on the sciatic nerve of other rabbits. "I laid bare," he says, "one of the sciatic nerves of another rabbit, and having wrapped it in linen as usual, I pierced it in several places with the point of a fine needle. The animal shrieked terribly, and died at the end of thirty-six hours. There were several dark spots in the nerve, and the parts adjacent to it were somewhat inflamed. The blood in the heart was black and coagulated." Other results were precisely similar.

The inferences from these experiments, then, are that the death of the animal, as well as the livid and red spots, were owing to the simple mechanical wound of the nerve; "that the venom of the viper, communicated to the nerves, neither occasions in any degree the disease of the venom, nor hastens the death of the animal; and lastly, that the venom of the viper is altogether harmless to the nerves, having no greater action on them than pure water. I have assured myself," the philosopher adds, "by other experiments, that it is not at all offensive to these organs."

This extraordinary result (which has been confirmed by subsequent inquirers) led to the examination of the effects of injecting into the blood-vessels the poison of the viper, without touching any solid part; when it was found that extreme pain is instantaneously excited, and frequently convulsions, and death immediately ensues. But with a view to prove still more decidedly that the poison affects the living body through the circulation only, Fontana made numerous experiments on the effects of interrupting the flow of blood in parts that were envenomed, and he found that instant amputation of the part prevented the influence of the venom. The period in which the poison is so far communicated to the system, as to render amputation useless, was found to be different in different animals, but perhaps greater, according to the size. In pigeons, it was found that at the end of fifteen seconds, the internal effect had been produced, and the *amputation* did not prevent speedy death: in guinea-pigs, amputation of the limb bitten at the end of one, two, and three minutes, preserved the life of the animal, and sometimes it was successful when delayed as long as six minutes.

But if this operation were successful, it occurred that interrupting the circulation of the part envenomed by a *ligature*, might also, if accomplished speedily, prevent the introduction of the poison into the system. Many experiments were, therefore, instituted by Fontana, by which he ascertained that, even in pigeons and small animals, which are certainly killed in a few minutes by the ordinary bite of a viper, the fatal influence of the poison is prevented by a ligature upon the limb, interrupting the circulation. The limb becomes swelled and livid below the ligature, sometimes discharging a blackish humour, and bordering apparently upon mortification. Another important inference also presented itself; for it was found that, after the ligature had remained in the limb of a pigeon a few hours (the exact length of time necessary was not fully determined), it might

be removed, and the constitution, nevertheless, was not injured by the poison.

On the whole, then, it was distinctly proved by Fontana, that the poison of the viper exerts no influence on an unbroken surface, nor on muscle, tendon, nerve, or any other of the solid parts of the living body, to which it is directly applied; but that it produces its deleterious effects exclusively when conveyed into the circulating blood. "This fluid," he says, "conveys the venom to the animal, and distributes it to its whole body. The action of the venom, and its effects on the blood, are almost instantaneous. The colour of the latter is suddenly changed, and from a bright red becomes livid and black. This first effect is succeeded by a second. The blood coagulates very suddenly in the lungs, heart, auricles, liver, and in the large veins. Sometimes the heart still continues its oscillatory motions, notwithstanding the blood it contains is, at least in part, coagulated. At other times the heart beats with greater force, as if for the purpose of stopping the principle of coagulation that exists in the blood.

"The blood, partly coagulated, and partly dissolved, produced a very violent derangement in the organs of the animal. The part bit by the viper swells instantly, and becomes gradually livid; the blood in the large veins stops and coagulates; the serous part transudes into the cellular membrane, which it entirely fills; the circulation is deranged in the viscera, diminishes by degrees, and at length ceases: its first cessation is in the lungs. In a word, the circulation is totally impeded, and the animal dies." *Loc. cit.* part iii. chap. 6.

From this view of the facts, Fontana was led to infer a principle (which some physiologists have deduced from the consideration of other facts), *viz.* that the *irritability* of muscular parts is something distinct from the *sensibility*, and not dependent upon the nervous system like the latter; and that this muscular irritability in the vessels, &c. is destroyed indirectly, but speedily, by the influence of the envenomed blood, which is thus instantaneously changed in its qualities. We shall see presently that a more accurate view of the subject has been subsequently made out.

Of the Antidotes to the Poison of the Viper and other Serpents.—Although it is chiefly on the poison of the viper that any accurate experiments have been instituted, either with a view to the discovery of the mode of its operation, or of the remedies for its deleterious effects; yet it is probable that the same principles may be transferred to the consideration of the poisons of the rattle-snakes, and the more fatal species of coluber, which differ perhaps rather in the degree of virulence, than in their nature and operation. In this country, however, the viper is the only snake whose bite is injurious, and it is satisfactory to learn from the ample experience of Fontana, that, although all the alleged antidotes appear to be destitute of the properties ascribed to them, yet that the bite of one viper is certainly not mortal to man. Animals appear to resist the poison in proportion to their size; and even middle-sized dogs generally resist the poison very well, without any remedy being administered; and the larger ones still better. "Five bites from three vipers were not sufficient to kill a dog that weighed nearly sixty pounds;" and as a man is seldom or never bit by more than one viper, so it is clear from the evidence collected by Fontana, that the chance of mortality from such a bite is not more than 1 to 100.

As in some other instances of disease, the natural tendency to recovery after these bites has obtained credit for every medicine that accident has caused to be administered in such cases. The theriacæ, the volatile alkali, the eau-de-

luce, the use of oil externally and internally, spirituous liquors, and other stimulants and sedatives, have obtained the credit of being specific antidotes to these poisons. The experiments of Mr. Oliver (related in the Philosophical Transactions, vol. xxxix. p. 310.), which appeared to countenance the favourable opinion of warm oil in the cure of these bites, were repeated at Oxford without success. (See the same vol. of the Phil. Trans. p. 394.) Linnæus, who was much disappointed in the use of oil, says that a woman, bitten by the coluber chersæa, died in great agony, though the oil was liberally administered. (*Amœnit. Academ.* vol. ii. 407, and vol. vi. p. 213.) With respect to the ammonia, the numerous experiments of Fontana demonstrated, "that the fluid volatile alkali is altogether useless, whether it is simply applied to the part bit by the viper, or swallowed by the animal at the same time," nay, he concluded, that instead of diminishing, it seemed to increase the virulence of the poison. The fat of the snake itself, which has been vulgarly deemed an antidote to its bite, is doubtless to be placed upon the same footing with the olive oil. The most rational mode of treatment, where a bite has been inflicted by a dangerous serpent, would appear to be the instantaneous application of a *tight ligature* round the limb, or round the finger or toe, where these parts happened to have received the bite.

For the information of those who may be under the necessity of exposing themselves to the venom of the more deadly serpents of America and the Indies, the following facts may be noticed, as they afford the best evidence of the existence of an antidote that we are acquainted with. Mr. Ireland, a surgeon of the English army in the island of St. Lucia, having heard of the reported efficacy of the Tanjore pill, used in India as an antidote to the venom of snakes, of which arsenic is the chief ingredient, was induced to try the liquor arsenicalis, or Fowler's solution, in some cases which occurred to his notice. He found that many of the soldiers had been bitten by the coluber carinatus, the fangs of which are from one and a half to two inches long, which inflict a considerable wound, and that *in all* the bite had been mortal in six, and from that to twelve hours from the time when it was received. Mr. Ireland administered the solution in large doses (of two drachms), which were repeated every half hour, for three or four hours. Vomiting and purging were produced, and all the patients (five) recovered. (See *Medico-Chirurgical Transactions*, vol. ii. p. 393 et seq., where the cases are related.) The efficacy of the Tanjore pill is recorded by Dr. Russell, in his *History of Indian serpents*.

Of the Poison of Fish.—A certain degree of poisonous influence is observed from some kinds of fish, in this country, in peculiar constitutions. Thus eels, salmon, herrings, and muscles, often induce a speedy and considerable disorder of the stomach, skin, and whole habit, sometimes accompanied by a high fever. Heat, sickness, and distention of the stomach, with headache, and a severe itching, pricking, and burning sensation of the skin, which is suddenly covered with a red rash, ensue soon after these articles are swallowed; and, if the stomach is not relieved by vomiting, the disorder does not entirely vanish for a day or two.

Some of the fish of the West Indian seas, however, produce a more violent and uniform effect, which has been well described by Dr. Thomas. (See *Memoirs of the Med. Society of London*, vol. v. part ii.) The fish most to be dreaded, he says, are the barracuta, yellow-bill sprat, cavallee, rock-fish, king-fish, smooth bottle-fish, and lobster. These fishes, however, are not uniformly poisonous, and the difference of their qualities is supposed to arise from the

difference of the food which they take, and, in some cases, to the circumstances of the entrails being allowed to remain in them some time after they are caught, which appear to be poisonous to animals. The rock-fish (*perca marina* of Catesby) is said to have the worst character for its poisonous quality of all the fish among the Bahama islands.

The consequences of eating this poison, Dr. Thomas affirms, are in general very alarming, and in many instances fatal. Some stomachs, however, are more susceptible of the action of the poison than others, and feel the effects of it almost immediately: the symptoms in others do not appear until two, three, or four hours after the accident; and some escape their violence altogether. The usual symptoms of fish-poison are cardialgia, nausea, severe vomiting and purging, griping pains in the bowels, cold sweats, fainting, and giddiness. The face in the mean time becomes highly flushed, and the eyes inflamed, attended with a burning heat and spasmodic twitches, which particularly affect the eyes, the sufferers often complaining that they are ready to start from their sockets. The burning which is felt in the face and eyes is extended to the palms of the hands, the tips of the fingers, and over the whole body; sometimes accompanied, and sometimes succeeded, by a miliary eruption, or by an efflorescence resembling the bite of a bug, but more extensive. The pulse for the most part is hard and frequent. This ardor of the skin, and a prickling in the hands and nose when immersed in cold water, are considered as diagnostics of the disease occasioned by fish-poison. The neck of the bladder, urethra, and sphincter ani, appear to sympathize with the skin, as the patients often complain of a similar heat in those parts, with a difficulty of making water, strangury, and afflicting tenesmus. The last and most tedious symptom, which may be rather considered as a secondary, is an acute and shooting pain in the articulations of the knee, wrist, ankles, and sometimes in the cylindrical bones, with more or less swelling. It is distressing at intervals for years after every other train of the disorder has disappeared, and is not unfrequently attended with œdema. The issue, however, is not always so favourable: the health of some who escape its fatal effects is often so much impaired, that a foundation is laid for a train of evils, and a visit to a cold climate is at last found necessary to restore vigour to their constitution.

For the cure of this disorder two indications are clearly pointed out; *viz.* to procure a discharge of the poison as speedily as possible, and to remove or alleviate the effects that result from it. The *first* indication can only be fulfilled by an active and expeditious emetic, such as the sulphate of zinc, which is alone sufficient to obviate the dangerous tendency of the poison; and with the view of more completely dispelling the cause of the disease from the digestive organs, a purgative, especially of some neutral salt, should be afterwards given. This method, Dr. Thomas observes, is practicable in robust constitutions; but in weak delicate habits, the vomiting and purging occasioned by the poison are so violent, and produce so much debility (resembling very much the disease called cholera), that it is often necessary to prescribe anodynes to allay these symptoms, even before it is certain that the stomach and bowels have been cleared of their noxious contents. For the *second* indication no positive rule can be laid down; as the treatment must be varied according to the nature and violence of the symptoms. If, after due evacuations, the symptoms of cholera still continue, which frequently happens, they should be checked by anodynes, cordials, and glysters of starch or gruel, with or without laudanum: and a liberal use of some mucilaginous drink should be recommended, as long as the strangury re-

mains. The administration of gentle diaphoretics, and especially Dover's powder, relieves the heat and irritation of the skin. The pains of the joints are sometimes very obstinate, and yield to nothing but time: relief may nevertheless be procured by decoctions of guaiacum and sarsaparilla, by wrapping the parts in flannel, and sometimes from the warm, and sometimes from the cold bath.

In the seventh volume of the Medical Facts and Observations (p. 289), edited by Dr. Simmons, Dr. Clarke observes that capsicum, or Cayenne pepper, has been known long ago to possess the power of preventing or counteracting the poisonous effects of fish. He adds, "this fish-poison seldom destroys life entirely, except the deadly poison of the yellow-billed sparrow, as it is called, which kills very speedily: but those who have eaten of the other kinds of poisonous fish are frequently reduced to the last extremity by vomiting, and life is almost extinguished before stimulants can take effect."

II. *Of Vegetable Poisons.*—The vegetable productions, which contain a matter deleterious to animal life, are very numerous. In some of them it is found naturally in such proportion, that the substance of the plant is fatal; but in many, the full effect of the poison is only obtained by the extraction of this matter in a concentrated state; as in the extracts of the poppy (opium), henbane, nightshade, &c.; in the essential oil of tobacco, bitter almonds, and the kernels of fruits; in the distilled waters of the lauro-cerastus, &c.; and in the preparations from the Upas, the Ticunas, or Woorara, employed by the Indians to poison their weapons of war. In this concentrated condition, many of these vegetable substances operate with a violence and fatality resembling the effects of the poison of the deadly serpents. They differ, however, in this respect, from the venom of those reptiles (if the experiments of Fontana are to be deemed conclusive), that they operate, when applied to the mucous membranes, with more rapidity than when introduced into wounds; as for instance, when swallowed into the stomach, or injected into the lower bowels, or even when applied to the tongue. The experiments of Fontana had taught him, that the living animal was affected through the same medium by the vegetable poisons, as by the animal venom, when they were applied to a wound; namely, through the medium of the circulation; and not by a direct influence on the nerves, the muscles, the lymphatics, tendons, or skin. He therefore inferred, that they acted, (as well as the animal poisons,) on the blood directly, and on the irritability of the muscular fibre, and not on the nervous system.

The experiments of Mr. Brodie, however, recently made under the correction of a better physiology, seem to put this question in a sufficiently clear light. They confirm the results stated by the Abbé Fontana, that vegetable poisons influence the living body, when applied to a wound, exclusively through the medium of the circulation, being conveyed to the brain only by mixing with the blood in the vessels; and that they are not conveyed through the medium of the nerves, nor of the absorbents. For a ligature upon the great vessels prevents them from producing their deleterious effects; whilst the division of the *nerves* of the part poisoned, and a ligature upon the *thoracic duct*, or general canal through which all the absorbents pour their contents into the blood, does not in the least retard or prevent the operation of the poison. (See *Philos. Trans.* for 1811.) But the effect of these vegetable poisons, when taken into the stomach, or even when put upon the tongue, is more rapid and fatal. Now, there are only two ways by which the living power can be influenced by substances applied to these

these unbroken surfaces; namely, by being absorbed into the circulation, or by the nervous sympathy between these surfaces and the common sensorium, or brain: and if we examine the facts, it will be very obvious, that it is through the latter medium that this influence is exerted, and not through the medium of the absorbent vessels.

In order, however, to comprehend fully the import of these facts, it will be proper to premise an observation or two relative to the immediate cause of death in general. It was demonstrated by the able and lamented physiologist, Bichât, that the functions of three organs only, the brain, the lungs, and the heart, are absolutely necessary to life; and that whenever the functions of one of these organs is suspended, death necessarily ensues. The stomach, the liver, the kidneys, and many other organs, are necessary to carry on the actions of the living body; but their constant action is not required; life will go on for some time during the complete suspension of their functions, which does not immediately occasion death. (See DEATH.) Secondly, the same ingenious physiologist observed, (and the observation has been confirmed by some experiments of Mr. Brodie, published in the *Philos. Trans.*.) that the influence of the brain is not directly necessary to the action of the heart; for that when the functions of the brain are destroyed, even when the head is removed, "the heart continues to contract for some time afterwards, and then ceases only in consequence of the suspension of respiration, which is under the influence of the brain." For if the lungs be alternately filled and emptied of air by mechanical means, the action of the heart may be carried on for an indefinite period, after the influence of the brain is entirely removed. We believe it has since been shewn by this indefatigable experimentalist, Mr. Brodie, that the destruction of the spinal marrow deprives the heart instantly of its powers of motion; upon which, therefore, it appears to be more immediately dependent, than upon the brain.

An examination of the facts, then, which Mr. Brodie has promulgated, will satisfactorily shew, that these poisons operate through the medium of the brain, in all instances; affecting this organ by nervous sympathy, when applied to mucous surfaces, and by being conveyed to it through the blood-vessels, when applied to a wound. And first we shall speak of the poisons applied to surfaces.

"Exp. 3.—Seven drams of *proof spirits* were injected into the stomach of a younger rabbit. Two minutes afterwards he evidently was affected by the spirits, and in three minutes more he lay on one side motionless and insensible. The pupils of the eyes were perfectly dilated; there were occasional slight convulsions of the extremities; the respiration was laborious, it was gradually performed at longer and longer intervals, and at the end of an hour and fifteen minutes had entirely ceased. Two minutes after the animal was apparently dead, I opened the thorax, and found the heart acting with moderate force and frequency, circulating dark coloured blood. I introduced a tube into the trachea, and produced artificial respiration by inflating the lungs, and found that by these means the action of the heart might be kept up to the natural standard, as in an animal from whom the head is removed.

"Exp. 4.—I injected into the stomach of a rabbit two ounces of *proof spirits*. The injection was scarcely completed, when the animal became perfectly insensible. Precisely the same symptoms took place as in the last experiment, and at the end of twenty-seven minutes from the time of the injection, the rabbit was apparently dead; but on examining the thorax, the heart was found still acting, as in the last experiment,

"Exp. 5.—One drop of the *essential oil of bitter almonds* was applied to the tongue of a young cat. She was instantly seized with violent convulsions; then lay on one side motionless, insensible, and breathing in a humid manner; the respirations became laboured, took place at longer and longer intervals, and at the end of five minutes from the application of the poison, had entirely ceased, and the animal was apparently dead: but on opening the thorax, the heart was found acting regularly eighty times in a minute, circulating dark coloured blood, and it continued to act for six or seven minutes afterwards."

It is unnecessary to prolong the detail of the experiments: it may be sufficient to state, that the same phenomena resulted, from the injection of two drops of the essential oil of bitter almonds, diffused in half an ounce of water, into the *rectum* of a cat; from the injection of the juice of *aconite* into the *rectum* of a cat; and from the application of the empyreumatic oil of *tobacco* to the tongue, and *rectum*, of cats and dogs, with the addition of sickness and vomiting in the latter cases.

Now it is obvious that the functions of the brain are immediately disordered by the influence of these poisons on the tongue, stomach, and lower bowel of animals, so instantaneously, that it is impossible that absorption should have already taken place. The complete insensibility to external impressions, the dilatation of the pupils of the eyes, and the loss of the power of motion, distinctly indicate, as Mr. Brodie observes, that the functions of the brain are suspended; respiration, which is under its influence, is imperfectly performed, and at length ceases altogether; while the heart, to which the action of the brain is not directly necessary, continues to contract, circulating dark-coloured blood for some time afterwards. There is a striking analogy, the same able physiologist remarks, between the symptoms arising from spirits and other poisons taken internally, and those produced by mechanical injuries of the brain. "Concussion of the brain, which may be considered as the slightest degree of injury, occasions a state of mind resembling intoxication, and the resemblance, in some instances, is so complete, that the most accurate observer cannot form a diagnosis, except from the history of the case. Pressure on the brain, which is a more severe injury than concussion, produces loss of motion, insensibility, and dilatation of the pupils; the respiration becomes laboured and stertorous, is performed at long intervals, and at last altogether ceases, and the patient dies."

The instantaneous influence of the poison of bitter almonds on the nervous system was experienced by Mr. Brodie himself, on applying a minute quantity to his tongue, at the end of a probe. He had scarcely touched the tongue, when he felt a very unpleasant and indescribable sensation, with a sudden feeling of weakness in his limbs, as if he had lost the command of his muscles, and he thought he was about to fall. Now the sudden operation of the poison, and its acting more speedily on the tongue, than when injected into the intestine, though the latter presents a better absorbing surface, added to the uninterrupted operation of it, when the thoracic duct is tied, leave no doubt that the brain is affected by the sympathetic communication of the nerves, and not in consequence of the absorption of the poison.

Mr. Brodie then proceeded to investigate, by experiment, the effects of the vegetable poisons, when applied to wounded surfaces. The essential oil of bitter almonds, the juice of *aconite*, the *woorara* (a poison used by the Indians of Guiana to arm the points of their arrows, and which Mr. Brodie considers the same as the *ticunas* used by Fontana),

and the *upas antiar*, a vegetable poison from Java, were the subjects of his experiments. It will be sufficient to quote his account of the operation of the first mentioned poison as an example of the whole.

“ Exp. 16.—I made an incision in the thigh of a rabbit, and introduced two drops of essential oil between the skin and the muscles. In four minutes after the application, he was seized with violent convulsions, and became insensible, and in two minutes more he was apparently dead; but the heart was felt through the ribs acting one hundred and twenty times in a minute, and it continued acting for several minutes. There were no other appearances in the limb, than would have resulted from an ordinary wound.

“ Exp. 17.—Two drops of the essential oil of almonds were introduced into a wound in the side of a mouse. Two minutes afterwards he was affected with symptoms similar to those which occurred in the last experiment, and in two minutes more he was apparently dead; but the heart continued to contract for some minutes afterwards.

“ From the experiments which I have just related,” Mr. Brodie adds, “and from others which it appears unnecessary to detail, as the general results were the same, I have learned that when the essential oil of almonds is applied to a wound, its effects are not so instantaneous as when it is applied to the tongue; otherwise there is no difference in its effects in whatever manner it is applied.” *Philos. Transactions*, loc. cit.

From these experiments, and from others in which the operation of the poisons was prevented by ligatures on the blood-vessels, but was not prevented by ligatures on the nerves, and on the great trunk of the absorbent vessels, it is fair to conclude, that these poisons affect the brain, by passing into the circulation through the divided vessels. “It is probable,” to borrow again the words of Mr. Brodie, when speaking of the woorara, “that it does not produce its effects, until it enters the substance of the brain, along with the blood, in which it is dissolved. Nor will the experiments of the abbé Fontana, in which he found the ticunas produce almost instant death, when injected into the jugular vein of a rabbit, be found to militate against this conclusion, when we consider how short is the distance, which, in so small an animal, the blood has to pass from the jugular vein to the carotid artery, and the great rapidity of the circulation; since in a rabbit under the influence of terror, during such an experiment, the heart cannot be supposed to act so seldom as three times in a second.”

From the knowledge of the fact, that these poisons act simply by suspending and injuring the functions of the brain, and that the heart continues to carry on the circulation for an indefinite time, Mr. Brodie was led to try by experiment, first, how long this action could be continued; and secondly, whether it might not, in some cases, be continued until the effects of the poison on the brain might subside, when the natural respiration might return, and the animal's life be saved. A rabbit was poisoned by the woorara, introduced in considerable quantity into two wounds. In seven minutes after the application, the hind legs were paralyzed, and in fifteen minutes respiration had ceased, and he was apparently dead. Two minutes afterwards the heart was still beating, and a tube was introduced through an opening into the trachea, by means of which the lungs were inflated. The artificial respiration was made regularly about thirty-six times in a minute, and was continued for the space of an hour and twenty-three minutes, when the pulse was beating one hundred times in a minute: there was no appearance of the recovery of the functions of the brain;

and the experiment was discontinued. While the artificial respiration was carried on, the blood in the femoral artery was of a florid red, and that in the femoral vein of a dark colour, as usual. Now, Mr. Brodie justly inferred, that as the circulation of the blood, and the usual changes in its colour, were maintained for more than an hour and twenty minutes after the poison had produced its full effects, it was evident, that the functions of the heart and lungs were unimpaired. But, that those of the brain had ceased, was proved by the continued insensibility of the animal, and by the cessation of the evolution of animal heat, to the generation of which Mr. Brodie's previous researches had proved the influence of the brain to be necessary.

In some subsequent experiments, in which less of the poison was introduced, and in which the temperature of the room was kept higher, to supply the loss of animal heat, and the artificial respiration was continued a longer time, (two hours and forty minutes,) the respiration at length became spontaneous, and recovery followed: but in others, the functions of the brain were not restored. Mr. Brodie upon this remarks, that “the circulation of the blood may be maintained in an animal, from whom the brain has been removed, for a considerable, but not for an unlimited time. We may conclude, that in the last of these experiments the animal did not recover, because the influence of the poison continued beyond the time during which the circulation may be maintained without the brain.” See *Further Experiments and Observations on the Action of Poisons on the Animal System*. *Philos. Transf.* for 1812.

Although the vegetable poisons, already mentioned, seem to affect the functions of the brain only, and through it the organs of respiration, leaving the powers of the circulation unimpaired; yet there are some vegetable poisons, namely, the two species of *upas* from Java, called *upas antiar*, and *upas tieute*, which appear to act upon the spinal marrow, and therefore upon the heart, destroying its irritability. It is extraordinary too, that, though the empyreumatic oil of *tobacco* affects the brain only, the infusion of that herb, when taken into the alimentary canal, suspends the action of the heart, producing syncope. The action of the heart was found by Mr. Brodie to cease, when this infusion was introduced into the rectum, and when the *upas antiar* was inserted in a wound, even before the animals had ceased to respire. It appears, too, from some experiments recently made at Paris, by M. Delile, with the *upas tieute*, that this poison acts upon the spinal marrow, without destroying the functions of the brain.

III. *Of Mineral Poisons*.—The action of these poisons appears to be somewhat more complex than that of the animal and vegetable poisons, and for our knowledge of the actual mode of operation of some of them we are indebted almost exclusively to the zealous physiologist, from whom so much of the foregoing information is derived, Mr. Brodie. As yet, indeed, his experiments have been limited to the effects of arsenic, barytes, tartrate of antimony, and the corrosive muriate of mercury; and it is not improbable that the acids and alkalies, and other caustic substances, may operate in a manner different from any of these.

With respect to *arsenic*, when taken into the stomach, so as to poison an animal, its obvious effects, discovered by dissection, are marks of inflammation in the stomach and bowels; and the common opinion entertained by medical men, is, that this inflammation is the cause of death, and the consequence of the actual irritation of the arsenic, in contact with the internal coat. But Mr. Brodie contends that this opinion is erroneous in both its parts. For in the first place,

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place, he has found the inflammation of the stomach, in several cases, so slight, that on a superficial examination it might have been easily overlooked; and in most of his experiments with this poison, death took place in too short a time to be considered as the result of inflammation. And, secondly, in whatever way the poison is introduced, the inflammation is confined to the stomach and intestines; and it is commonly more violent, and more immediate, when the arsenic is applied to a wound, than when it is taken internally, and it likewise precedes any appearance of inflammation of the wound. This fact was proved by an experiment, made by Mr. Hunter and Sir Everard Home, and by many repetitions of it by Mr. Brodie.

In all these experiments made with arsenic, applied in different ways and in different preparations, the results were, in all essential circumstances, the same. The symptoms, Mr. Brodie observes, may be referred to the influence of the poison on the nervous system, the heart, and the alimentary canal. With respect to the heart, he admits, that it is most probably affected only through the medium of its nerves; but he distinguishes it from the nervous system generally, because its action is so far independent of the brain, that its motion may go on undisturbed while the functions of the brain are suspended, and it may cease to contract, and the circulation be stopped, while the functions of the brain are not impaired. As of these three organs, the brain and the heart only are concerned in the functions immediately necessary to life, and as the alimentary canal is often affected only in a slight degree; so Mr. Brodie infers, that the affection of the two former must be considered as the immediate cause of death.

The symptoms observed in these experiments, as affecting these organs respectively, "were, 1st, paralysis of the hind legs, and afterwards of the other parts of the body, convulsions, dilatation of the pupils of the eyes, insensibility, all of which indicate disturbance of the brain; 2dly, a feeble, slow, intermitting pulse, indicating disturbance of the functions of the heart, whose action cannot be prolonged by artificial respiration; 3dly, pain in the region of the abdomen, preternatural secretion of mucus from the alimentary canal, sickness and vomiting in those animals which are capable of vomiting,—symptoms which arise from the action of the poison on the stomach and intestines."

As the affection of one or other of these three organs predominated, there is necessarily a considerable variety in the symptoms produced, and Mr. Brodie's observations respecting these varieties are valuable.

"In many cases where death takes place, there is only a very slight degree of inflammation of the alimentary canal; in other cases the inflammation is considerable: it generally begins very soon after the poison is administered, and appears greater or less, according to the time which elapses before the animal dies. Under the same circumstances, it is less in gramivorous than in carnivorous animals. The inflammation is greatest in the stomach and rectum; but it usually extends also over the whole intestine. I have never observed inflammation of the œsophagus. The inflammation is greater in degree, and more speedy in taking place, when arsenic is applied to a wound, than when it is taken into the stomach. The inflamed parts are in general universally red; at other times they are red only in spots. The principal vessels leading to the stomach and intestines are tinged with blood; but the inflammation is usually confined to the mucous membrane of these viscera, which assumes a florid red colour, becomes soft and pulpy, and is separable without much difficulty from the cellular coat, which has its natural appearance. In some instances there are small spots of extravasated blood on

the inner surface of the mucous membrane, or between it and the cellular coat, and this occurs independently of vomiting. I have never, in any of my experiments, found ulceration or sloughing of the stomach or intestine; but if the animal survives for a certain length of time after the inflammation has begun, it is reasonable to conclude that it may terminate in one or other of these ways."

Barytes in its uncombined state, and still more actively the *muriate of barytes*, produces similar deleterious effects on the animal frame as arsenic, whether it is taken into the stomach, or applied to a wound. Its operation is, however, less violent than that of the arsenical poisons. In animals that are capable of vomiting it operates as an emetic, and more speedily when taken into the stomach, than when introduced into a wound; but it affects the stomach less than arsenic, both in respect to the vomiting, and to the marks of inflammation which it leaves; and the intestines are scarcely inflamed by it. In many instances a thin layer of dark-coloured coagulum of blood is found lining the whole inner surface of the stomach, and adhering very closely to it, so as to have a good deal the appearance of a slough: and this is not the effect of vomiting, as it was observed only in rabbits, which do not vomit. The heart is with difficulty supported in its action by artificially inflating the lungs, after the operation of barytes. It was found, however, by Mr. Brodie, that when a probe was introduced into the spinal marrow, powerful contractions might be excited not only of the voluntary muscles, but also of the heart and intestines, by the galvanic influence, whence he inferred, that the muriate of barytes, like arsenic, affects the circulation by rendering the heart insensible to the stimulus of the blood, and not by destroying altogether the power of muscular contraction.

Emetic tartar, whether applied to a wound or taken in sufficient quantity into the stomach, produces effects perfectly analogous to those of arsenic and barytes. It is followed by paralysis, drowsiness, and at last complete insensibility; the pulse becomes feeble; and the heart continues to act a short time, and may be maintained by artificial respiration, after apparent death, but only for a few minutes. It appears, therefore, that this poison acts on the heart as well as on the brain; but that its principal action is on the latter. Both the voluntary and involuntary muscles may be made to contract after death by means of the Voltaic battery. The stomach is not always inflamed, and the intestines seldom, if ever.

Corrosive sublimate, or the oxymuriate of mercury, does not affect the living body in the same manner as the preceding mineral poisons. When taken internally in considerable quantity, indeed, it occasions death in a short time: but if it be applied to a wounded surface, it produces a slough of the parts, without affecting in any way the general system. A solution of a few grains of this poison, injected into the stomach of cats and rabbits, produced after a few minutes insensibility, convulsions, and death, and the heart was found not acting at all, or acting very feebly. The mucous membrane of the stomach, especially of the cardiac portion, was of a dark grey colour, and was easily torn and peeled off: in some parts its texture was completely destroyed, so that it appeared like a pulp, on removing which the muscular and peritoneal coats were exposed. This alteration of the texture of the internal membrane of the stomach appears to have been occasioned by its being chemically acted on by the corrosive muriate; since when it is injected into the stomach of a dead rabbit precisely the same changes are produced.

The destruction of the substance of the internal membrane of the stomach, as well as the non-appearance of any constitutional symptoms when the muriate is applied to a wound,

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wound, precludes the idea, Mr. Brodie observes, of the poison having been absorbed into the circulation. "We must conclude, then," he adds, "that death was the consequence of the chemical action of the poison on the stomach. This organ, however, is not directly necessary to life, since its functions, under certain circumstances, are suspended for hours, or even for days, without death being produced. Although the stomach was the part primarily affected, the immediate cause of death must be looked for in the cessation of the functions of one or more of those organs, whose constant action is necessary to life. From the scarlet colour of the blood in the left side of the heart, in the experiment on the rabbit, we may conclude that the functions of the lungs were not affected; but the affection of the heart and brain is proved by the convulsions, the insensibility, the affection of the pulse, and the sudden cessation of the heart's action in the first experiment; and we may, therefore, be justified in concluding, that the immediate cause of death was in both these organs. Farther, as the effects produced appear to have been independent of absorption, we may presume that the heart, as well as the brain, was acted on through the medium of the nerves. That sudden and violent injury of the stomach should be capable of thus speedily proving fatal is not surprising, when we consider the powerful sympathy between it and the organs on which life more immediately depends, and the existence of which many circumstances in disease daily demonstrate to us."

It has been shewn, then, from the numerous experiments of the abbé Fontana and Mr. Brodie, as above described, that the animal, vegetable, and mineral poisons, operate upon the nervous system, and through this medium destroy the functions of one, or all the three organs, upon which life immediately depends. The poison of serpents operates upon the nervous system only when introduced into the circulating blood, and does not influence the nerves of the stomach: it is probable, too, that it affects principally the brain, and organs of respiration, without any immediate influence on the heart; although this point was not attended to by Fontana. The vegetable poisons operate, in general, both on the sentient extremities of the nerves in the stomach and other mucous surfaces, and when introduced into the circulation, but influence different parts of the nervous system respectively. Thus the poison of the bitter almond, alcohol, aconite, woorara, the empyreumatic oil of tobacco, &c. affect the brain, whilst they leave the heart in possession of its moving powers; the infusion of tobacco appears to affect both the brain and the heart; whilst the two species of opium appear to paralyse the powers of the heart, and to exert little comparative influence on the brain, (such at least, the writer was informed by Mr. Brodie, has subsequently appeared to be the fact.) The mineral poisons, again, appear to affect the nervous system in a similar manner, but more extensively, and at the same time injure the stomach and intestines, so that their action is more complex than that of the other poisons, and the chance of recovery from their influence is much less than from the influence of the animal and vegetable poisons.

It is doubtful, indeed, whether the corrosive sublimate possesses any property that influences the nervous system, except by its primary *chemical* action on the stomach, by which the texture of this organ is injured or destroyed; and it is probable that the other *caustic* and corrosive substances, such as the strong mineral acids, and pure alkalies, operate in the same way, and not by any narcotic or directly deleterious influence upon the nervous system. Experiments, indeed, are wanting upon this subject; but an accident, which recently occurred within the knowledge of the writer of this

article, confirms, as far as one instance can be of any weight, this opinion. A child drank from a vial a small quantity of the strong sulphuric acid (oil of vitriol) by mistake, about half past four o'clock in the afternoon. Vomiting was immediately excited by the mother, by putting a finger down the throat. The child did not complain of much pain, except when she coughed or vomited; and continued perfectly sensible until nine o'clock in the evening, when she died without a struggle. The body was examined by dissection the following morning, when a large aperture was found in the greater curvature of the stomach, through which the food and other contents of the stomach had passed into the sac of the omentum. The omentum itself was blackened and reduced to a half pulpy state, by the action of the acid, but still retained a sufficient degree of consistence, to contain the substances which had passed into it. The perfect condition of all the functions of the nervous system, which continued for above five hours, and did not fail until the texture of the stomach was actually destroyed, marks the freedom from any direct poisonous influence upon the brain, and leads to the same inference which Mr. Brodie drew respecting the operation of the corrosive sublimate, that the brain ultimately suffered only from its sympathy with the injured structure of the stomach.

On the Treatment of those who have swallowed Poison.— Having examined the mode in which the different poisonous substances operate upon the living body, we are prepared to inquire briefly into the appropriate methods of treatment to be resorted to, in cases where any of them have been swallowed by accident or design. It is to be lamented, however, that we are not in possession of any substance, by which the deleterious qualities of the animal and vegetable poisons are capable of being corrected or altered; and that, although some of the mineral poisons, especially those of a corrosive or caustic nature, may be neutralized or decomposed by chemical means, yet their destructive action is generally too rapid to be materially diminished by any chemical combination, especially where they have been taken or given with an intention of destroying life. Among the ancients, many absurd ideas prevailed respecting the multiplicity and operation of poisons, which gave rise to equally unfounded notions of the number and efficacy of antidotes, which might be found to counteract their effects. It was supposed that what were denominated *slow* poisons might be prepared, so as to undermine the vital powers, and to produce death by insensible steps within a definite time; and against the operation of these, the fears and alarms of individuals were constantly on the alert, and the skill and ingenuity of the preparers of drugs were often principally directed. Whence the old treatises of pharmacy abound with recipes for antidotes of various reputed efficacy, to many of which the names of their inventors were annexed, but whose powers of resisting the action of poisons were purely imaginary. In fact, it was easy for any medicine to acquire that character, when the very existence of such poisons was equally gratuitous, and when security, which had never been endangered, was imputed to the operation of every farrago of drugs, that the caprice of the apothecary could bring together. The removal of the dread of poison may be reckoned among the many advantages, which a more extensive acquisition of the knowledge of nature has produced; for in the earlier periods of history, it was generally believed that poisons could be made to operate in the most secret and imperceptible ways; not only through the medium of the food and drink; but through that of the clothes that were worn, or even of the utensils that were touched, and of the flowers and perfumes that were smelt at. But these opinions and fears

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fears were the result of ignorance, or of the designs of half-learned individuals, who benefited by the credulity of their contemporaries.

The operation of poisons, when taken into the stomach, being generally manifest and rapid, and no actual antidote to their properties being in our possession, the principal object to be aimed at, in administering to the relief of those who may have swallowed them, of whatever nature, is to rid the stomach of them with all possible expedition. *Vomiting*, therefore, should be attempted to be excited immediately on the discovery that any poisonous substance has been taken into the stomach. As *emetic* drugs are not always at hand, the action of vomiting may be sometimes produced by putting a finger down the throat, or by tickling the internal fauces with a feather, and sometimes by a copious draught of warm water, which last, if the poison be of an acrid or corrosive nature, will also tend to weaken its injurious qualities by dilution. When an emetic is resorted to, it should be such a one as will act speedily; and with this view, instead of the antimonials or ipecacuanha, fifteen grains, or a scruple, of the *sulphate of zinc* (white vitriol) is usually given, which, in general, returns by vomiting almost instantly, and constitutes the most expeditious emetic that we possess, which is, at the same time, but slightly offensive to the stomach. Dr. Withering affirms that the distilled water of the *ranunculus flammula* is preferable to the white vitriol, inasmuch as it produces instantaneous vomiting, without exciting those painful contractions in the upper part of the stomach, which sometimes follow the use of the former. (See his *Botan. Arrang.* vol. ii. p. 504. *note.*) It often happens, indeed, when the vegetable narcotics are swallowed in large quantities, especially laudanum or solid opium, that the nerves of the stomach are so paralyzed or rendered torpid by the influence of the poison, that it is extremely difficult, if not impossible, to excite it to the action of vomiting, and, in this case, it becomes necessary to repeat the efforts to rouse it, even by more active means. In a case where six ounces of laudanum had been swallowed, and little or no evacuation produced six hours afterwards, although a drachm and half of sulphate of zinc had been swallowed, a solution of fifteen grains of the blue vitriol, or *sulphate of copper*, was administered, which in the course of a minute produced a copious discharge of fluid by vomiting; after which, by persevering in other means to counteract the torpor of the nervous system, such as constantly dragging the patient about the room, administering ammonia, assafœtida, and other stimulants, recovery was accomplished. See a case by Dr. Marcet, in the *Medico-Chirurg. Transact.* vol. i. p. 77.

Among the poisons of mineral origin, and others, which act by their corrosive qualities, the strong mineral acids, and the caustic alkalis, may certainly be deprived of their caustic power by dilution, and more especially by neutralization. Nevertheless as their action is very speedy upon the parts with which they come in contact, the effect of swallowing either a diluent or a neutralizing substance will be of little avail, if it is not immediately at hand. Where a strong acid has been known to be swallowed, however, it would certainly be advisable to administer, as soon as possible, an alkali in solution; and if caustic alkali has been taken, a diluted acid might be given. Those corrosive salts which an alkaline solution would decompose, as is the case with most of the metallic salts, might be, perhaps, in some degree disarmed of their virulence by a speedy administration of such a solution. The combinations of arsenic and barytes, which are deleterious in all their forms, and act independently of their chemical qualities, require to be treated

nearly as the vegetable poisons, in the first instance by vomiting and by dilution. By animals, which are capable of vomiting, indeed, Mr. Brodie affirms that the greater portion of the arsenic that is swallowed, is commonly rejected by spontaneous vomiting very soon after it has been taken; and whether the poison has been rejected spontaneously, or in consequence of artificial sickness, a disease which is not found in cases of poisoning by the vegetable narcotics, remains to be treated; namely, the inflammation of the stomach and bowels. In some instances, when a person has survived the immediate effects of arsenic as a poison, death has nevertheless ensued in a few days from the consequences of this inflammation; as in a case mentioned by Mr. Brodie, which occurred in St. Bartholomew's hospital, and was related to him by Mr. Earle; in which extensive ulcerations were found in the mucous membrane of the stomach and bowels after death. In a similar case, which was treated by Dr. Roget, the patient, after having swallowed sixty grains of white arsenic, had vomited profusely, and probably discharged the whole of the poison, as the vomiting was assisted by copious dilution; it did not appear, indeed, from the analysis of the fluid, vomited at the time the patient was first seen by Dr. Roget, about sixteen hours after the poison was taken, that any of it remained in the stomach. A severe train of symptoms, however, ensued, indicative of inflammation in the stomach and bowels, which demanded the use of the lancet and blisters and other evacuants; and under this treatment the patient recovered. The recovery was slow, and various untoward symptoms occurred, such as an extension of the inflammation to the lungs and the spleen, and likewise several symptoms indicative of the disturbance of the sensorium, such as coma, dilated pupils, and even convulsions. See *Medico-Chirurg. Transact.* vol. ii. p. 136.

In all cases, then, where poison has been obviously swallowed, the first step to be taken is the evacuation of the stomach by vomiting. The subsequent measures will be dictated partly by the nature of the poison, where that is known, and any neutralizing or decomposing substance is at hand; and partly by the nature of the symptoms which ensue, and which, in the case of arsenic in particular, are likely to be of an inflammatory kind, indicative of gastritis and enteritis; and in all cases, whether the species of poison can be ascertained or not, the free promotion of the vomiting, by copious draughts of warm water, should at all events be resorted to.

That part of *medical jurisprudence* which relates the evidence of the effects of poison in producing certain instances of death, would be a subject of interesting discussion; but very little that is universally applicable could be laid down here. In getting rid of the ancient notions of slow and imperceptible poisons, above alluded to, we have cut short much of the legal discussions upon these subjects. These erroneous opinions were very prevalent, even in the time of lord Bacon; for that great luminary of science himself, in his charge against the earl of Somerset, for the murder of sir Thomas Overbury, in the Tower, seems to give credit to the story of Livia, who is said to have poisoned the figs upon the tree, which her husband was wont to gather with his own hands; and he seriously states, that "Weston chased the poor prisoner with poison after poison; poisoning salts, poisoning meats, poisoning sweet-meats, poisoning medicines and vomits, until at last his body was almost come, by the use of poisons, to the state that Mithridates's body was by the use of treacle and preservatives, that the force of poisons was blunted upon him; Weston confessing, when he was tried for not dispatching him, that he had given
enough

enough to poison twenty men." Bacon's Works, vol. ii. p. 614.

There is, however, still considerable difficulty, in many cases, in deciding upon the cause of death, where poison is supposed to have been administered; for the two principal sources of evidence, the examination of the contents of the stomach, and the dissection of the body, are both liable to some uncertainty. This difficulty was strongly exemplified in the contrariety of evidence advanced at the trial, in the case of Miss Burns, at Lancaster, in 1808. (See Annual Medical Register, vol. i. art. 47, for 1808.) In such cases, the absence of any poisonous substance among the contents of the stomach, as found after death, cannot be deemed satisfactory evidence that the person did *not* die from poison: for it was proved by experiments on animals, instituted on that occasion by Dr. Bostock and others, that the oxy-muriate of mercury (corrosive sublimate) may be given, and may speedily prove fatal, and yet that not a particle of it shall be detected in the contents of the stomach after death. Again, the fact which Mr. John Hunter first pointed out, that in animals and men, who die suddenly while in health, the gastric juice is capable of acting on the stomach itself, so as to corrode its coats, renders extreme caution necessary in pronouncing upon the action of a poisonous substance on the coats of the stomach. Mr. Hunter, indeed, asserts, that some degree of this digestion or erosion of the stomach, at its great end, is very commonly observed; he says, too, "that when the stomach is actually perforated, the edges of this opening appear to be half dissolved, very much like that kind of dissolution which fleshy parts undergo when half dissolved in a living stomach, or when dissolved by a caustic alkali, *viz.* pulpy, tender, ragged." These observations evince the necessity of combining a consideration of the symptoms which preceded death, and of other appearances observed on dissection, with the actual state of the stomach, before any decision is given. The appearances of inflammation in the stomach, intestines, and other viscera, if there be any, should be carefully taken into the view; and even these appearances are deceptive, as has been recently shewn by Dr. Yelloly in numerous dissections of the stomach after violent death: for in such instances there is commonly a redness, which has been considered as inflammatory, but which is obviously independent of inflammation. (See *Medico-Chirurg. Transact.* vol. iv.) Inflammation and erosion of the stomach are, indeed, common effects of acrid poison; but they are also occasionally absent where such poison has been taken.

On the whole, therefore, no person who has not had ample experience of the appearances of the stomach after death, under various circumstances of health and disease, by frequent inspection, should presume to pronounce on the actual operation of a poison, except the presence of the poisonous substance be also detected, or a concurrence of certain symptoms, with the appearances found on dissection, should warrant such a decision.

We have deemed it unnecessary to enter into a minute detail of the symptoms occasioned by particular preparations of these poisons, as they vary much in different individuals, or to enumerate all the substances, either vegetable or mineral, which possess these deleterious properties. With respect to the mineral poisons, the reader will find an ample history in Dr. John Johnstone's "Essay on Mineral Poisons," 1795; and with regard to the vegetable, he may consult Wilmer's "Observations on Poisonous Vegetables," 1781, and Houlston on Poisons. A comprehensive catalogue of all the poisons known is contained in the "Toxicologia," of Plenck, above quoted.

POISON-*Ash*, in *Botany*. See RHUS and TOXICODENDRON.

POISON-*Berry*, a species of *Cestrum*.

POISON, *Indian*. See GECCO.

POISON, *Macassar*. See MACASSAR *Poison*.

POISON-*Nut*. See STRYCHNOS.

POISON-*Oak*. See RHUS.

POISON-*Tree*, or POISON-*Wood*, *Toxicodendron*. See RHUS.

POISON-*Tusk*. See HIPPOMENE.

POISON, *Counter*. See COUNTER-*Poison*.

POISON *Cove*, in *Geography*, a part of Carter's bay, on the W. coast of North America; where poisonous muscles were eaten by Capt. Vancouver's crew.

POISON *Island*, a small island in the Atlantic, near the coast of Africa. S. lat. 10° 6'. W. long. 15° 3'.

To POISON a *Piece*, among *Gunners*, is the same as to clog and nail it up. See NAILING.

POISONING, in *Law*, the crime of administering poison to a person, whereby he dies.

This is, of all species of deaths, the most detestable; because it can of any be the least prevented either by manhood or forethought. (3 Inst. 48.) And, therefore, by 22 Hen. VIII. cap. 9. it was made treason; and the punishment inflicted for it was, to be put alive into a cauldron of water and boiled to death. But this act was repealed by 1 Edw. VI. cap. 12.

At present it is only murder, or felony without benefit of clergy, if the party dies of the poison within a year and a day. See MURDER.

POISONING, in *War*, is considered by the law of nations as more odious than even assassination; because, when practised treacherously, the effect would be more inevitable, and the use more terrible; accordingly it has been more generally detested. Of this Grotius (b. iii. ch. 4. § 15.) has given numerous instances. The consuls Caius Fabricius and Q. Æmilius rejected with horror the proposal of Pyrrhus's physician to poison his master, and even gave notice to that prince, that he might beware of the traitor, haughtily adding, "It is not to make our court to you, that we give the information, but that we may not draw on ourselves any infamy." (Plut. in Vit. Pyrrhi.) And they say in the same letter, that it is for the common interest of all nations not to set such examples. It was a maxim of the Roman senate, that war was to be carried on by arms, and not by poison. (Aul. Gell. Nat. Attic. lib. iii. c. 8.) Even Tiberius himself rejected the proposal made by the prince of the Catti, that if poison was sent to him, he would destroy Arminius: and he received for answer, that the Roman people chastised their enemies by open force, without having recourse to wicked practices and secret machinations. (Val. Max. l. vi. c. 5. Tacit. Annal. l. ii. c. 88.) Tiberius thus made it his glory to imitate the virtue of ancient Roman commanders. This instance is the more remarkable, as Arminius had treacherously cut off Varius with three Roman legions. The senate, and even Tiberius himself, did not think that poison was to be made use of even against a deceiver, or by way of re-tortion or reprisal. Assassination and poisoning are therefore contrary to the laws of war, and equally exploded by the law of nature, and the consent of civilised people. The sovereign practising such execrable means should be accounted the enemy of mankind, and the common safety calls on all nations to unite against him, and join their forces to punish him. His conduct particularly authorises the enemy, who had been attacked by such odious means, to give him no quarter. Alexander declared, "that he was determined to pursue Darius to the utmost, and no longer

as a fair enemy, but as a poisoner and an assassin." (Quint. Curt. l. iv. c. 11.) The interest and safety of commanders and rulers, so far from countenancing such practices, should excite them to use all possible care to suppress them. It was wisely said of Eumenes, "that he did not think any general would, to gain a victory, set a pernicious example, which might recoil on himself." And it was on this same principle, that Alexander formed his judgment of Bessus, who had assassinated Darius. Q. Curt. l. vi. c. 3.

Although the use of poisoned arms is a practice that may be excused with a little more plausibility, as it has in it no treachery nor any thing that is clandestine; yet this is no less interdicted by the law of nature, which does not allow us to multiply the evils of war. War is never permitted to nations, but from necessity; and all are to refrain from methods which tend to render it more destructive, and they are even obliged to oppose them. It is therefore with reason, and agreeably to their duty, that civilized nations have classed among the laws of war, the maxim which prohibits the poisoning of arms. (Grotius, b. iii. c. 4. § 16.) And all are warranted by their common safety to suppress and punish the first who should offer to break through this law. The poisoning of waters, wells, and springs, is still more generally condemned, because, as some authors say, innocent persons, as well as enemies, may lose their lives. This, indeed, is a farther reason, but it is not the only, nor indeed the true one; for it is lawful to fire on an enemy's ship, though there may be neutral passengers on board. But though poison is not to be used, it is very allowable to divert the water, to cut off the springs, or in any other way to render them useless, that the enemy may be reduced to surrender. (Grot. ubi supra, § 17.) In the conduct of war, says the admirable Vattel, we should never forget that our enemies are men. If we are under the disagreeable necessity of prosecuting our right by force of arms, let us not destroy that charity which connects us with all mankind. Thus shall we courageously defend our country's rights without hurting those of society. Our courage will preserve itself from every stain of cruelty, and the lustre of victory will not be tarnished by inhuman and brutal actions. De Vattel's Law of Nations, b. iii. c. 8.

POISONOUS WATERS. See WATER.

POISSY, in *Geography*, a town of France, in the department of the Seine and Oise, and chief place of a canton, in the district of Versailles; three miles N.W. of St. Germain. The place contains 2437, and the canton 14,924 inhabitants, on a territory of 145 kilometres, in 17 communes.

POITIERS, a town of France, and chief place of a district, in the department of the Vienne, before the revolution the see of a bishop, and residence of the governor of Poitou. Its principal manufactures are stockings, woolen-caps, gloves, and combs. In this town are some remains of Roman antiquities. It was near this town that a battle was fought in 1356, between the English and the French, when the latter were defeated, and the king taken prisoner. The army of the English, led on by the Black prince, amounted only to 12,000 men, and the French to 60,000. The place contains 18,223 inhabitants, 10,025 in one canton, which includes 11,710, in two communes, and 8200 in another canton, including 10,573, in seven communes. The whole territory contains 150 kilometres. N. lat. 46° 35'. E. long. 0° 26'.

POITMANS DORF, a town of Silesia, in the principality of Neisse; seven miles S.W. of Grotkau.

POITOU, a province of France before the revolution, on the S. of the Loire; now forming the departments of

the Vienne, the Two Sevres, and Vendée; the capital of which was Poitiers.

POITU, a town of Sweden, in the province of Finland; 30 miles N.N.E. of Abo.

POIVRE, N., in *Biography*, a traveller, and intendant of the isles of France and Bourbon, was born at Lyons in the year 1715. He entered into the congregation of foreign missionaries, by whom he was sent to China, a great part of which empire he traversed as a philosophical observer. Having been thrown into prison in consequence of a mistake, he defended himself so well before a mandarin in the Chinese language, that he was honourably discharged. On his return to Europe he had the misfortune to lose an arm in an engagement with an English vessel, and his first observation on the accident was, that he was disabled for a painter. He was also obliged to renounce the ecclesiastical profession; but the India Company, to whom he was known as an active and intelligent person, employed him, in 1749, to establish a new branch of commerce in CochinChina. In this undertaking he displayed great talents for business, with the most scrupulous integrity. In 1766, he was sent by the duke de Choiseul as intendant to the isles of France and Bourbon, for the purpose of introducing improvements into these colonies. M. Poivre fully answered the ends of his mission. He imported a vast number of sheep from Madagascar, formed a nursery of every kind of useful trees adapted to the climate, and after many efforts naturalised the bread fruit, the clove, and nutmeg. He died at Lyons in the year 1786. As an author he published the following works: "Voyage d'un Philosophe," containing a brief account of Asia, Africa, and America, chiefly relative to agriculture: "A Memoir on the Preparation and Dyeing of Silk;" "Remarks on the History and Manners of China;" "Discourses addressed to the Inhabitants of the Isles of France and Bourbon." His sentiments are those of a friend to liberty and the happiness of mankind.

POIX, in *Geography*, a town of France, in the department of the Somme, and chief place of a canton, in the district of Amiens; 14 miles S.W. of Amiens. The place contains 751, and the canton 11,513 inhabitants, on a territory of 227½ kilometres, in 34 communes.

POKA, a town of Hindoostan, in Bahar; 30 miles N. of Bettyar.

POKARYA, a town of Bengal; 16 miles S. of Nattore.

POKE, or PORK *Physic*, in *Botany*. See PHYTOLACCA.

POKE, in *Rural Economy*, a small sack or bag for common purposes, as well as for those of containing hops.

POKE, a disease among sheep, which is much the same as the rot. See ROT.

POKECHU, in *Geography*, a town of Bengal; nine miles N. of Toree.

POKETALICO, a river of Virginia, which runs into the Kanhawa, N. lat. 38° 16'. W. long. 81° 51'.

POKFLIES, a town of Austria; 12 miles N.E. of Vienna.

POKONCA, a mountain of Pennsylvania; 22 miles N.W. of Easton.

POKRA, a river of Sclavonia, which runs into the Save; six miles S.W. of Craliovavelika.

POKRATZ, a town of Sclavonia, on the river Pokra; 16 miles E. of Craliovavelika.

POKREJE, or POKROJA, a town of Samogitia; 25 miles S.W. of Birza.

POKROPSKOE, a town of Russia, in the government of Perm; 20 miles S.W. of Kungur.

POKROV, a town of Russia, in the government of

Vladimir, on the Kliazma; 44 miles W.S.W. of Vladimir. N. lat. $53^{\circ} 24'$. E. long. $39^{\circ} 14'$.

POKROVA, or BOGORODITZ, a town of Russia, in the province of Usting, on the river Sula; 60 miles E. of Lalsk.

POKROVSKAIA, a town of Russia, in the government of Saratov, on the E. side of the Volga, opposite to Saratov.

POKROVSKOE, a town of Russia, in the government of Ekaterinoflav; 16 miles W.S.W. of Slavenfk.

POKROVSKOI, a town of Russia, in the government of Irkutsk; 32 miles S.W. of Yakutsk.—Also, a town of Russia, in the government of Archangel, on the Baga; 36 miles S. of Schenkursk.—Also, a town of Russia, in the province of Vologda; 16 miles W.S.W. of Totma.—Also, a town of Russia, in the government of Vologda; 32 miles N. of Totma.

POKTOO, a town of the Birman empire; 30 miles W. of Ava.

POL, ST., a town of France, and principal place of a district, in the department of the straits of Calais. The place contains 2949, and the canton 13,547 inhabitants, on a territory of 230 kilimetres, in 43 communes.

POL de Leon, St., a town of France, in the department of Finisterre, and chief place of a canton, in the district of Morlaix. The place contains 5038, and the canton 13,847 inhabitants, on a territory of 115 kilimetres, in seven communes.

POLA, a town of Istria, on a mountain, near a bay of the Adriatic; the see of a bishop, suffragan of Udina. The harbour, or bay, twelve miles in circuit, is formed and protected by a chain of very pleasant hills; the entrance of which, however, is too narrow for large vessels. The town, which is surrounded with walls, has four gates, and a castle situated towards the sea, on an eminence almost in the middle of the town. It was a Roman colony, and possesses many antiquities, viz. an amphitheatre, 366 feet long, 292 broad, and 72 feet high, with 145 arches, ranged in two lines; and nearly in the centre of the town are the ruins of two temples, one built in honour of L. Sergius Lepidus, by his consort Salvia Posthuma, and the other by the town of Pola, in honour of the city of Rome and Augustus. The town contains about 7000 inhabitants, whose trade principally consists in the fishery of tunny fish, carried on between the rocks near Pola; 30 miles S. of Capo d'Istria. N. lat. $45^{\circ} 5'$. E. long. $14^{\circ} 3'$.

POLA, a town of the island of Rhodes. N. lat. $36^{\circ} 14'$. E. long. $27^{\circ} 26'$.

POLA, or *Otewhei*, one of the Navigator's islands, in the S. Pacific ocean. S. lat. $13^{\circ} 52'$. W. long. $172^{\circ} 20'$.

POLA, a small island in the Mediterranean, near the S. coast of Sardinia. N. lat. $39^{\circ} 8'$. E. long. $9^{\circ} 15'$.—Also, a river of Russia, in the government of Novgorod, which runs into lake Ilmen, eight miles E. of Stara Raza.

POLA de Lena, a town of Spain, in the province of Asturia; 12 miles S. of Oviedo.

POLA, in *Ichthyology*, the name of a flat fish, something resembling the foal, but shorter and smaller; commonly called *cynoglossus* and *linguatuia*.

It is caught in the Mediterranean, and sold in Rome and Venice for the table.

POLABERG, or POLAPERG, in *Geography*, a town of Austria; 11 miles S.W. of St. Polten.

POLACCA, in *Musie*, a Polish air or tune for dancing.

POLACRE, in *Naval Language*, a merchant vessel used in the Mediterranean. These vessels have three pole masts, without tops, caps, or cross-trees, and a bowsprit of one

piece; they have bolsters fixed, as a stop to the shrouds stays, &c. The mizen-mast is sometimes not in one piece. Their rigging is light, having no top-mast shrouds, &c., but a rope ladder is fixed instead, from the mast heads to the upper part of the lower rigging. They carry the same sails as a ship, and have square yards; all of which, except the lower yards, are without horses; for they then stand upon the lower yards to loose or furl the top-sails, and upon the top-fail yards to loose or furl the top-gallant sails, as the yards are easily lowered for that purpose.

POLACRE-Settee, a vessel with three masts, usually navigated in the Levant or Mediterranean. These vessels are generally rigged with square-sails upon the main and mizen-mast, and the latteen-fail upon the fore-mast, like a xebec, (which see); and sometimes a latteen-fail upon the mizen-mast, and only square-sails on the main-mast. The main-mast always keeps the rigging of the polacre.

POLAEDRASTYLA, in *Natural History*, the name of a genus of crystals. The word is derived from the Greek πολλυς, many, εδρα, sides, the privative particle a, not, and συλος, a column; and expresses a crystal composed of many planes, and having no column.

The bodies of this genus are crystals composed of two octangular pyramids, joined base to base, and consequently the whole body consisting of sixteen planes. Of this genus there are only two known species: 1. A brown kind with short pyramids, found in considerable plenty in Virginia, on the sides of hills; and 2. A colourless one, with longer pyramids. This has yet been found only in one place, which is the great mine at Gossalaer, in Saxony, and there usually lies at great depths. Hill.

POLAND, in *Geography*, once a considerable kingdom of Europe, but now totally dismembered and divided among neighbouring states, was bounded on the N. by Prussia, Courland and Russia, on the S. by Hungary and Moldavia, and on the W. by Silesia, Pomerania, and Moravia; about 200 miles long and 560 broad. In its primitive condition, and in its utmost extent, Poland comprehended 13 provinces or districts: viz. Great Poland, called also Lower Poland, which included the palatinates of Posen or Pofnania, Kalish, Siradia, Lenciez, and Rawa;—Cujavia, containing the palatinates of Brzeskie and Wladislaw;—Masovia, including the palatinates of Czerfk and Ploczko;—Polish Prussia, including Pomerelia, the palatinate of Culm, the government of Marienburg and Ermeland;—Little Poland, containing the palatinates of Cracow, Sandomir, and Lublin;—Podlachia, or the palatinate of Bielsk;—Little Russia, or Red Russia, comprehending the palatinates of Chelm, Belz, and Lemberg;—Podolia and Braclaw;—palatinate of Kiev;—and Volhynia. To these may be added Lithuania, which was considered as a part of Poland, together with Samogitia and Courland. Of these, Great Poland, Polish Prussia, and part of Lithuania, have been seized by Prussia;—Little Poland and Red Russia were annexed to Austria; while the remainder and greater part of Lithuania, Courland, Polesia, Podolia, palatinate of Kiev and Volhynia, were seized by Russia: so that in the year 1793, Samogitia, Masovia, and Podlachia, were the only territories that remained to constitute the kingdom of Poland. Since that time Samogitia has been annexed to Russia, and the king of Prussia seized the other two. By the peace of Tilsit, it was agreed that all the part of Poland, which Prussia had added to her dominions since the year 1772, should be erected into an hereditary principality, under the title of the duchy of Warsaw, and given to the king of Saxony. Other changes are likely soon to take place, in consequence of the union and

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and concurring operations of the allies, which will again overturn the arrangements which Bonaparte, the late emperor of France, had established. Of these we shall be able to give an account in some subsequent articles.

For an account of the productions of Poland, we refer to the articles comprehending the countries to which its several parts are annexed, as well as to the names of those districts as they occur. We shall here introduce a brief history of Poland, with an account of its various revolutions and of the cause that produced them. Poland, in the changes which it has since undergone, and in the situation in which it now appears, presents an interesting subject of enquiry to the philosopher and the politician. About a century ago it was one of the most respectable powers in Europe; but it has now not only lost its nominal existence and independence as a nation, but it is totally annihilated. By the progressive events that have terminated in its destruction, it has exhibited an almost uninterrupted scene of disorder and calamity. Sometimes overrun and pillaged by foreign enemies, and generally distracted by internal dissensions, peace and security and settled government have been, in consequence of a series of disastrous occurrences, almost unknown. Kings have been raised to the throne, and precipitated from it. Constitutions have been established, and altered, and overthrown, and removed. Some of its finest provinces have been dismembered; and foreign armies established in the republic, either to perpetuate its miseries, or to complete its subjugation. The situation of the country previously to its total extinction as a separate state, exhibited the most striking impressions of these convulsions. The principles of disorder, long ago incorporated into the frame of the constitution, have been matured and perfected by the habits of party dissention, heightened by religious animosity, and fomented by the insidious policy of the neighbouring states. Law and justice have been silenced by the strife of faction, or overwhelmed by the pressure of foreign force. The people, reduced to the lowest state of degradation and oppression, have had no interest in the measures of government, and no incitement to industry. The practice of selling the crown to the highest bidder soon introduced an almost universal venality among the nobility. Amidst the violence of faction, honour and principle have been swept away; and while almost every nation in Europe has been advancing in improvement and civilization, Poland appeared to have been long stationary, if its progress was not indeed rather retrograde. The nature of the Polish government has been, without doubt, the principal source from which the misfortunes of this country have taken their rise. From a sketch of the government of Poland, we shall perceive the weakness of the state keeping pace with what the Poles have called the freedom of the constitution. Little can be certainly known respecting the origin of the Polish government. In the Roman times Poland was chiefly possessed by the Sarmatæ or Slavons; and the Poles pretend to have their dukes from the 6th century. The description given by Tacitus of the tribes from which the Poles are, most probably, descended, the analogy of other northern nations, and the general tenour of the Polish history, tend to prove, that the great body of the people enjoyed a high degree of freedom, as well as a considerable influence on the measures of government. Although the sovereign power was generally continued in the same family, there was no established rule of hereditary succession. If a free election did not take place on every vacancy, the consent of the nation, expressed in a general diet, was always necessary to confirm the nomination of a successor to the ducal dignity. While the government remained in

this state, the people were really free; and yet the sovereign power appears to have been subject to no constitutional restrictions. Neither the prerogative of the duke, nor the privileges of the people, were defined by positive law. Custom seems to have formed the only restriction to either. The sovereign carried his power as far as he thought he could depend upon the submission of the nation; and the people sometimes exerted their right of expelling a tyrannical master, and asserting their freedom by force. The government, for a considerable time, subsisted in this undefined state. The first circumstance which seems to have had any permanent influence on the form of the government and the condition of the people, was the practice of bestowing fiefs upon the feudal principles. This institution, which is said to have been introduced into Poland about the year 820, invested the feudal lords with a species of authority over their vassals, which was eventually the more fatal, as in the time of ignorance it was not accurately defined. The introduction of Christianity was another event, which, by tending to strengthen the power of the aristocracy, concurred to produce the changes which afterwards took place in the government. The Poles embraced the Christian religion about the year 964, when the spiritual tyranny of Europe was at its height; and the despotic principles of the Roman Catholic church were received along with the Roman Catholic faith. The apostles of this church assumed in their mission a tone of authority corresponding to the high claims of their temporal head. No sooner had they established themselves in Poland than they found themselves placed in a situation highly favourable to their ambitious views. In process of time the domineering spirit of the Roman Catholic hierarchy, concurring with the arbitrary principles of the feudal system, gave an easy victory to the clergy and nobility over the liberties of the people: the people of course felt the consequence of these institutions in the extinction of their political privileges. They were excluded from the diet of election: the nobility and clergy reserving to themselves the sole right of regulating the succession to the sovereignty. The abridgment of personal liberty soon followed the loss of political importance; and oppressions were multiplied: they were gradually deprived of the rights of men, as well as of those of citizens. The law being too weak, or too corrupt to afford them relief, they sunk into a state of servitude, from which they never afterwards emerged. This will be sufficiently evident in the progress of their history. Their sovereigns are usually ranged in four classes or periods; *viz.* those of the house of Lesko, of Piast, of Jaghellon, and of different families. The first period is considered as fabulous: and the best Polish historians usually commence their narratives at the second era; and the early part even of this, which is dated A.D. 842, has much the air of romance. Destitute of letters, and immersed in Pagan superstition, faithful accounts are not to be expected from such people. The authenticity of the Polish annals cannot be dated earlier than the accession of Miecslaus II., the fourth sovereign of the line of Piast in 964. During the whole of this period, as some writers say, the monarchy was elective, and the sovereign power limited; but according to others, the crown was hereditary, and its authority absolute. The fact seems to have been, in accordance with both these statements, that the crown continued in the same family, and therefore seemed to be hereditary; but it had an elective appearance, because, on the death of the king, his successor was formally nominated and recognized in an assembly of the nobility and clergy of the realm. Towards the close of this second period, A.D.

1347, Casimir the Great restrained the turbulence of the principal barons, and granted certain immunities to the nobles and gentry. (See CASIMIR, surnamed the *Great*.) If Casimir had been succeeded by a line of hereditary monarchs, the barons would not have recovered their former ascendancy, and the feudal system would have been gradually annihilated in Poland as in other countries of Europe. But his nephew and successor Louis, king of Hungary, being a foreigner, was obliged to ratify certain conditions, which circumscribed the prerogative of the crown, and increased the power of the barons and inferior nobles. He agreed that no taxes should be imposed without the consent of the nation; and that in case of his demise without male heirs, the privilege of appointing a sovereign should revert to the body of nobles.

The third period begins with the death of Louis in 1382, when the Poles set aside his son-in-law Sigismund, and raised to the throne Ladislaus Jaghellon, duke of Lithuania, who confirmed all the stipulations of Louis. He was succeeded by his son Ladislaus III., and Ladislaus by his brother Casimir, who introduced further innovations unfavourable to royal prerogative. One of the principal events in this reign, which gave occasion to more important revolutions in the Polish government, was the convention of a national diet invested with the sole power of granting supplies. On this account the reign of Casimir has been considered by the popular party as the era, at which the freedom of the constitution was permanently established. His second son and successor, John Albert, assented, without hesitation, to all the immunities extorted from his predecessors, and swore to the observance of them in a general diet held at Patrikau, in 1469. His brother and successor, Alexander, declared in 1505, the following limitations of sovereign authority to be fundamental laws of the kingdom: the king cannot impose taxes; nor require the feudal services; nor alienate the royal domains; nor enact laws; nor coin money; nor alter the process in the courts of justice. The first attempt towards establishing a free election of the king was brought forward in the reign of Sigismund Augustus, son and successor of Sigismund I., who had succeeded Alexander: he was constrained in 1550 to agree, that no future monarch should succeed to the throne unless freely elected by the nation. During the Jaghellon line, which terminated with Sigismund Augustus, the sovereigns, although formally raised to the throne by the consent of the nation, still rested their pretensions upon hereditary right, as well as upon this consent, always styling themselves *heirs* of the kingdom of Poland.

The fourth period commences from the demise of Sigismund Augustus A.D. 1572, when all title to the crown from hereditary right was formally abrogated, and absolute freedom of election established. At this era a charter of immunities was drawn up in a general diet, to be ratified by the new sovereign before his election. (See PACTA CONVENTA.) Henry of Valois secured his election, partly by private bribes to the nobles, and partly by promising an annual pension to the republic from the revenues of France. His example was followed by each succeeding sovereign, who, besides an unconditional ratification of the "Pacta Conventa," purchased the crown by a public largess and by private corruption, circumstances which endeared an elective monarchy to the Poles. Under Stephen Bathori, the regal power was farther circumscribed by the appointment of 16 resident senators chosen at each diet to attend the king, and to give their opinion in all matters of importance, which prevented him from issuing any decree without their consent. Another fatal blow was given to the prerogative in 1578,

by annihilating the supreme jurisdiction, or the power of judging in the last resort the causes of the nobles, except such as arose within a small distance from the royal residence. The turbulent reign of John Casimir was marked by the introduction of the "Liberum Veto," or the power which each nuncio claims or exercises of interposing a negative, and, in consequence of that interposition, of breaking up the diet; a privilege which the sovereign himself does not possess, and which has principally contributed to destroy the true balance of the Polish constitution. But the king was still the fountain of honour, and besides the principal dignities and offices of the republic, he bestowed the "Starosties," or royal fiefs, which are held during the life-time of the possessor. Hence he still maintained great influence in the councils of the nation; but this last solitary branch of royal prerogative was wrested from the crown at the establishment of the permanent council A.D. 1733. From the preceding detail it appears, that from the time of Louis the nobles continued to diminish the regal authority, and to augment their own privileges. It also appears, that though the Poles were accustomed to boast of their liberty, they were by no means free. Their liberty was, in reality, a turbulent system of aristocratic licentiousness, where a few members of the community were above the controul of the law, and the majority excluded from its protection. The history of this country evidently shews, that the Poles were more free at home, and more independent and flourishing abroad, when the sovereign had greater authority, when the nobles assisted at the diets without the privilege of dissolving them, and when they submitted themselves and their peasants to the jurisdiction of the king.

On the demise of Augustus III. Stanislaus Augustus, son of count Poniatowski, the friend and companion of Charles XII. was supported in his pretensions to the crown by the empress of Russia and the king of Prussia, and also aided by a party among the nobles, and also recommended by his great personal accomplishments, was raised to the throne in 1764, in the 22d year of his age. He possessed talents, and virtues, which were calculated to rescue Poland from its deplorable state, if the defects of the constitution had not fettered his exertions for the public good. But all flattering prefaces were disappointed by the factions of a turbulent people, fomented by the intrigues of the neighbouring powers; and the most amiable of the Polish sovereigns was doomed to experience the dreadful effects of that excessive liberty, or rather licentiousness, which is inconsistent with the existence of a well-regulated government. The body of Polish religionists, called "Dissidents," make a principal figure in the subsequent commotions of this reign. (See DISSIDENTS.) In consequence of the indulgences granted to the Dissidents, at an extraordinary diet convened in 1768, a general dissatisfaction prevailed among the Roman Catholics, and several confederacies were formed in defence of the sacred Catholic faith. Poland became a scene of bloodshed and devastation; and the confederates, secretly encouraged by the house of Austria, assisted by the Turks, and supplied with money and officers by the French, protracted hostilities from the dissolution of the diet in 1768 to the division of Poland in 1772. Among other acts of cruelty which were perpetrated by the confederates, one, which was meditated, but not accomplished, was the assassination of the king. A period was now approaching which teemed with an event that disgraces the history of Europe. Treaties upon treaties, and negotiations upon negotiations, guaranteed to Poland the possession of her territory; and at the king's accession the three powers that dismembered her provinces

provinces solemnly renounced all right to any part of the Polish dominions; but treaties and guaranties afford no security against interest and ambition. The natural strength of Poland, if properly exerted, would have formed a more certain bulwark against the ambition of her neighbours than the faith of treaties; and it is worthy of remark, that of the three partitioning powers, Prussia was formerly in a state of vassalage to the republic; Russia once saw her capital and throne possessed by the Poles, under Sigismund III. whose troops got possession of Moscow, and whose son Ladislaus was chosen great duke of Muscovy by a party of the Russian nobles; and Austria was indebted to John Sobieski, king of Poland, who, in 1683, compelled the Turks to raise the siege of Vienna, and delivered the house of Austria from the greatest dangers it ever experienced. "The partition of Poland," says Mr. Coxe, whose account of this infamous transaction we shall give in his own words, "was first projected by the king of Prussia. Polish or Western Prussia had long been an object of his ambition; exclusive of its fertility, commerce, and population, the local situation rendered it highly valuable; it lay between his German dominions and Eastern Prussia, and while possessed by the Poles, cut off all communication between them. During the course of the seven years war, Frederic experienced the most fatal effects from this disunited position of his territories. By the acquisition of Western Prussia, his dominions would be rendered compact, and his troops in time of war be able to march from Berlin to Königsberg without interruption. The period was now arrived, when the situation of Poland seemed to promise the attainment of this favourite object. He pursued it, however, with all the caution of an able politician. On the commencement of the troubles, he shewed no eagerness to interfere in the affairs of this country, and although he concurred with the empress of Russia in raising Stanislaus Augustus to the throne of Poland, yet he declined taking an active part against the confederates. Afterwards, in 1769, when the whole kingdom was convulsed with civil commotions, and desolated by the plague, he advanced his troops into Polish Prussia, and occupied that whole district, under pretence of forming lines to prevent the spreading of the infection.

"Though completely master of the country, and not apprehensive of a formidable resistance from the disunited Poles; yet, aware that the security of his new acquisition depended upon the concurrence of Russia and Austria, he planned the partition. He communicated the project to the emperor, by whom it was readily adopted, either during their interview at Nies in Silesia, in 1769, or in the following year, at Neustadt in Moravia. Joseph who had secretly encouraged the confederates, and even commenced a negotiation with the Porte against Russia, now suddenly altered his measures, and increased his army towards the Polish frontiers. The plague presenting to him, as well as to the king of Prussia, a specious motive for stationing troops in the dominions of the republic, he gradually extended his lines, and, in 1772, occupied the whole territory, which he has since dismembered. But, notwithstanding this change in his sentiments, his real views upon Poland were at first effectually concealed; and the confederates imagined that the Austrian army was advancing to act in their favour.

"Nothing remained towards completing the partition, but the accession of the empress of Russia, who was too discerning a politician not to regard with a jealous eye the introduction of foreign powers into Poland. Possessing an uncontroled ascendancy over the whole country, she could propose no material advantage from the formal acquisition

of a part, and must purchase a moderate addition to her territory by a considerable surrender of authority. Frederic, well acquainted with the capacity of the empress to discern the true interests of Russia, forbore opening any negotiation on the subject of the partition, until she was involved in a Turkish war. At that crisis he dispatched his brother prince Henry to Petersburg, who suggested to the empress that the house of Austria was concluding an alliance with the Porte; that nevertheless the friendship of that house was to be purchased by acceding to the partition, upon which condition the emperor would suffer the Russians to prosecute the war without interruption. Catharine, anxious to push her conquests against the Turks, and dreading the interposition of the emperor; perceiving likewise, from the intimate union between the courts of Vienna and Berlin, that she could not prevent the intended partition, closed with the proposal, and selected no inconsiderable portion of the Polish territories for herself. The treaty was signed at Petersburg in the beginning of February 1772, by the Russian, Austrian, and Prussian plenipotentiaries.

"As the troops of the three courts were already in possession of the greater part of Poland, the confederates, hemmed in on all sides, were soon dispersed; and Europe waited in anxious expectation. Yet the partitioning powers proceeded with such profound secrecy, that even after the ratification of the treaty, only vague conjectures were entertained at Warsaw concerning their real intentions; and the late lord Cathcart, the English minister at Petersburg, obtained no authentic information of its signature, until two months after the event.

"The first formal notification of any pretensions to the Polish territory was in September 1772, announced to the king and senate assembled at Warsaw, by the imperial ambassador, which was soon followed by the memorials of the Russian and Prussian courts, specifying their respective claims. It would be tedious to enter into a detail of the pleas urged by the three powers in favour of their several demands; it would be no less uninteresting to lay before the reader the answers and remonstrances of the king and senate, as well as the appeals to the other states which had guaranteed the possessions of Poland. The courts of London, Paris, Stockholm, and Copenhagen, remonstrated; but remonstrances without assistance were of no effect. Poland submitted to the dismemberment, not however without the most violent struggles, and, for the first time, felt and lamented the fatal effects of faction and discord."

According to the will of the three courts a diet was convoked by the king to be held on the 19th of April 1773, when the partitioning treaty, after considerable opposition on the part of the Poles and under the enforcement of threats and bribes by the three powers, was finally ratified.

Of the dismembered countries, the Russian province was the largest, the Austrian the most populous, and the Prussian the most commercial. The province allotted to Russia comprised Polish Livonia, that part of the palatinate of Polotsk, which lies to the east of the Duna, the palatinates of Vitepsk, Miecislaw, and two small portions to the N.E. and S.E. of the palatinate of Minsk: this tract of land (Polish Livonia excepted) is situated in White Russia, and includes at least one-third of Livonia. The Russian limits of the new province are formed by the Duna, from its mouth to above Vitepsk; from thence by a straight line running directly south to the source of the Drug near Tolitzin, by the Drug to its junction with the Dnieper, and, lastly, by the Dnieper to the point where it receives the Sotz. This territory is now divided into the two governments of Polotsk and Mohilef: the population amounts to

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pendent kingdom, contains several navigable rivers, flowing in all directions, and conveying its exports to the havens of the Baltic. By means of the Vistula and its tributary rivers, the productions of the palatinates of Cracow, Lublin, and Masovia, are sent to Thorn and Dantzick. By the Niemen, the commodities of Lithuania are transported to Memmel, and by the Duna those of Eastern Lithuania and White Russia to Riga. The chief exports are all species of grain, hemp, flax, cattle, malts, planks, timber for ship-building, pitch and tar, honey, wax, tallow, potash, and leather: the imports are foreign wines, cloths, stuffs, manufactured silks and cotton, fine linen, hardware, tin, copper, silver and gold, glass ware, and furs. From the various productions and great fertility of the soil, the trade might have been carried to a considerable height; but many causes tended to suppress the spirit of commerce. The nobles were degraded if they engaged in traffic. The burghers of the large towns were not sufficiently rich to establish manufactories, and either through want of industry, or dread of excessive extortions from the principal nobility, left the retail trade in the hands of foreigners and Jews. The inhabitants of the small towns, exposed to greater oppressions, were still more disqualified from pursuing any branch of commerce. The peasants being slaves, and the property of their master, could not remove from the place of their nativity without his consent. As the Poles drew from foreign countries the greater part of the manufactured goods necessary for home consumption, the specie which it exported exceeded the imported more than 20,000,000 Polish florins, or 555,555*l*. Poland was formerly called the granary of the North; but through neglect of cultivation, it lost this character; the exportation of corn not corresponding to the nature of the soil, or the extent of its provinces, which, properly improved, would have been capable of supplying half Europe with grain. The inattention of the Poles to the natural advantages of their country, has been exemplified in the following instance, as well as many others. By means of the Notez, a river of Great Poland, which falls into the Oder, the Poles might have conveyed grain into Silesia, and down the Oder into other parts of Germany; but they never attempted the navigation from an ill-founded notion of its impracticability. But the king of Prussia had no sooner acquired possession of the country watered by the Notez, but it was instantly covered with vessels.

The king had a corps of near 1000 troops in his own pay, consisting chiefly of Ulans, or light horse, who furnished his escort. These Ulans are chiefly Tartars, many of them Mahometans, and distinguished for their fidelity. The armies of Poland and Lithuania were independent of each other, and separately commanded by the respective great generals. In 1778, that of Poland consisted of 11,438 effective men; and that of Lithuania of 6987; making a total of 18,425. In 1790, when the Poles were preparing to establish a new constitution, and to render themselves independent of foreign powers, their army is stated by count Mofynski to have consisted of 65,074 men.

The Poles appear, by the description of Mr. Coxe, to have been a lively people, and to have used much action in their conversation. In salutation they commonly incline the head, and strike the breast with one hand, while they stretch the other towards the ground; but when a common person meets a superior, he bows his head almost to the earth, at the same time waving his hand, with which he touches the leg, near the heel, of the person to whom he pays his obeisance. The men of all ranks generally wear whiskers, and shave their heads, leaving only a circle of hair upon the

crown. The summer dress of the peasants consists of a shirt and drawers of coarse linen, without shoes or stockings, and round caps or hats. The women of the lower class wear upon their heads a wrapper of white linen, under which their hair is braided, and hangs down to the middle. The dress of the higher orders, both of men and women, is extremely elegant; that of the gentlemen being a waistcoat without sleeves, with an upper robe of a different colour, which reaches below the knee, and is fastened round the waist with a sash or girdle: the sleeves are in warm weather tied behind the shoulders: in summer the robe is of silk; in winter, of cloth, velvet, or stuff, edged with fur; a sabre is a necessary appendage of the dress as a mark of nobility. They wear fur-caps or bonnets, and buskins of yellow leather, the heels of which are plated with iron or steel. The dress of the ladies is a simple polonaise, or long robe, edged with fur. The Poles in their features, aspect, customs, dress, and general appearance, resemble Asiatics rather than Europeans, and are unquestionably descended from Tartar ancestors. Mascow, a German historian, well versed in the antiquity of nations, observes, that the manner in which the Poles wear their hair is a striking token of their origin. As early as the fifth century, some nations, comprehended under the name of Scythians, had the same customs.

The earliest coin of Poland is that of Boleslaus I. son of Micislaus, already mentioned: it was struck in 999, probably soon after the introduction of coining into Poland: it bears no head of the sovereign, but the Polish eagle on one side, and a crown on the reverse. Poland had formerly three universities, one at Cracow, another at Wilna, and a third at Posen. The Polish language is derived from the old Slavonic; but it very much differs from all the other languages having the same source. The German and also the Latin languages are much used in Poland. The religion formerly professed in Poland was the Roman Catholic; a decree of the Pacification diet, held in the year 1736, enjoining that no person should be elected king of Poland, or great duke of Lithuania, without first making a solemn profession of the Roman Catholic religion. The Dissidents are composed of Lutherans, Calvinists, and Greeks. (See DISSIDENTS.) The Jews were indulged with great privileges, and were so numerous, that Poland was styled the paradise of the Jews. Their number is supposed to have amounted to two millions. The mode of punishment for atrocious crimes was beheading or hanging; lesser delinquencies were punished by whipping, hard labour, and imprisonment; the nobles never suffered any corporal punishment, but were liable only to imprisonment and death. Torture was abolished in 1776, by an edict of the diet, introduced by the influence of the king; a regulation which evinces his judgment no less than his benevolence. For other particulars, which it is now unnecessary to detail, we refer to Coxe's Travels in Poland, &c., vol. i.

The Poles have a national melody peculiar to their own country in music. What is called a *Polonese*, or *Polacca*, in the rest of Europe, is always in triple time, and resembles our hornpipe in that measure, except that the close is made on the second note of the bar instead of the first. All the national music of Poland that we have seen is in this measure, but played faster for dancing than singing.

During the time that the electors of Saxony were kings of Poland, those splendid princes introduced a good Italian and German taste at Warsaw, and had operas performed there in great perfection.

POLAND, a town of America, in the county of Cumberland, and province of Maine; 30 miles N. of Portland.

The

The northern part of the town is now *Minot*. It has 2870 inhabitants.—Also, a town of the duchy of Carniola; 6 miles S.S.E. of Gottschee.

POLANGEN, or **POLENGEN**, a small town, or rather village, of Poland, in the country to which it gives name, situated near the sea-shore, famous for the amber collected near it, and which constitutes an article of commerce.

POLANIECZ, a town of Poland, in the palatinate of Sandomirz; 28 miles S.W. of Sandomirz.

POLAR, something that relates to the poles of the world. In this sense we say, polar virtue, polar tendency, &c. See **POLARITY**.

POLAR, or *White Bear*, in *Zoology*, a species of bear, *URSUS Maritimus*, (which see,) with a long head and neck, short round ears, end of the nose black, large teeth, hair long, soft, white, and tinged in some parts with yellow, and limbs of great size and strength. This animal, which grows to a great size, so that the skins of some are thirteen feet long, is confined to the coldest part of the globe; being unknown, except on the shores of Hudson's Bay, Greenland, and Spitzbergen. In summer the white bears make their residence on islands of ice; they swim with great agility for six or seven leagues, and are excellent divers. Their winter retreats are in dens under the snow or the fixed ice of the frozen sea. Their food is fish, seals, and the carcases of whales, and human bodies, which they will greedily devour; and they are so fond of human blood, that they will attack companies of armed men, and even board small vessels. On land they live on birds and their eggs. They bring two young at a time, and their mutual attachment is so strong, that they would die sooner than desert one another. Their greatest enemy is the morse. The flesh is white, and said to taste like mutton; the fat is melted for train oil, and that of the feet used in medicine: but the liver is very unwholesome. Pennant.

POLAR Circles. See **Polar CIRCLES**.

POLAR Dials, are those whose planes are parallel to some great circle passing through the poles, or to some one of the hour-circles; so that the pole is neither elevated above, nor depressed below the plane.

Such a dial, therefore, can have no centre, and consequently its style, sub-style, and hour-lines, are parallel.

This, therefore, will be an horizontal dial to those who live under the equator or line.

POLAR Dial, *To construct a*. See **DIAL**.

POLAR Projection, is a representation of the earth, or heavens, projected on the plane of one of the polar circles. See **PROJECTION**.

POLAR Star, or *Black Ribband*, *Order of the*, an order of knighthood in Sweden, was instituted by Frederic I. in 1748, and with regard to the election of knights, is subject to the same regulations as the orders of the *Seraphim* and the *Sword*—which see. This order consists of 48 knights, exclusive of foreigners, and six for the clergy, and 24 commanders, exclusive of four for the clergy, besides the senators of the realm, and knights of the *Seraphim*, who are also commanders of this order. Princes of the blood royal of Sweden are born knights, and may receive the ensigns of the order, whenever the sovereign of the order thinks proper. The commanders wear broad black ribbands round their necks, with the ensign of the order, or great cross, pendent from them. The knights wear a smaller ensign of the order, pendent to a black ribband at their button-hole. The collar of the order is of gold, composed of chased ornaments, linked together with chains, encompassing mullets of five points, enamelled white, edged with gold, and two letters F, back to back, enamelled blue, edged

with gold, alternately the letters crowned with the regal crown of Sweden, richly chased; to the centre hangs a star of gold, of eight points, enamelled white, edged with gold; on the centre a circle enamelled blue; thereon a star of five points, enamelled white, encircled with the following motto: *NESCIT OCCASUM*; in gold, between the angles, four ducal crowns; between the two upper points of the star a regal crown of Sweden, by which it hangs to the collar. This order, before the institution of that of *Vasa*, was conferred on men of letters.

POLARITY, the quality of a thing considered as having poles.

By heating an iron bar, and letting it cool in a vertical posture, it acquires a polarity. The lower end becomes the north pole, the upper the south.

Iron bars acquire a polarity, by being kept a long time in an erect posture, even without heating. Thus the bars of windows, &c. are frequently found to have poles. Nay a rod of iron acquires a polarity, by the mere holding it erect; the lower end, in that case, attracting the south end of a magnetic needle, and the upper, the north end. But these poles are mutable, and shift with the situation of the rod. See **MAGNET**.

Some modern writers, particularly Dr. Higgins, in his *Philosophical Essay concerning Light*, have maintained the polarity of the parts of matter, or that their simple attractions are more forcible in one direction, or axis of each atom, than in any other.

POLAROM, in *Geography*, a town of Hindoostan, in the circar of Rajamundry; 18 miles N.N.W. of Rajamundry.

POLCENIGO, a town of Friuli, on the borders of the *Trevifan*; 23 miles N. of *Trevigio*.

POLCH, a town of France, in the department of the Rhine and Moselle, and chief place of a canton, in the district of Coblenz. The place contains 1200, and the canton 4255 inhabitants, in 15 communes.

POLDER, a town of Africa, on the Gold Coast, in the canton of Agouna.

POLE, **REGINALD**, in *Biography*, cardinal, distinguished as a statesman, was born in the year 1500. He was distantly related to Henry VII. and Edward IV. Having laid the foundation of a good grammatical education under the Carthusians of the monastery at Sheen, he was removed to Magdalen college, Oxford. At a proper time he entered into deacon's orders, and at an early age had several benefices conferred upon him, through the favour of Henry VIII. In 1519 he quitted Oxford, and going to Italy, he took up his abode at Padua, then in very high reputation for polite literature. Here he contracted an intimacy with Bembo, and other distinguished characters. His progress in learning was proportionate to the opportunities that he enjoyed. He returned to England in 1525, and was received at court in such a manner, as might have led him to form the highest expectations with regard to preferment. For the present he chose to pass his life in retirement, after which he went to Paris, on the pretext of pursuing his studies; but the real cause was, that he might not be involved in those disputes which he foresaw would result from the king's pretended scruples concerning his union with Catharine of Arragon, his brother's widow. After he had passed some time at Paris, he received a requisition to concur with the king's agents in procuring the decision of the university of Paris in favour of the illegitimacy of his marriage, and the propriety of a divorce. As this opinion was contrary to the sentiments of Pole, he endeavoured to extricate himself by pleading his unsuitness for such a business; but he could not thereby escape the

the displeasure of the king. Upon his return he retired to Sheen, where he spent two years more free from molestation. Henry was now outrageous at the delays respecting the divorce, and throwing himself upon the support of his own people, it became an important step to gain over a person of Pole's rank and reputation. The king demanded an interview, but he was unable to shake his resolution, and though he was dismissed with tokens of regard, he thought it prudent to withdraw to the continent. He lived successively at Avignon, Padua, and Venice, cultivating friendships with the most eminent characters for learning and piety. In the mean time Henry had proceeded to extremities in his favourite plans. He had divorced Catharine, married Anne Boleyn, and revenged himself of the Roman see, by declaring himself head of the English church. He procured a book to be written in defence of this title, by Dr. Sampson, bishop of Chichester, which he caused to be transmitted to Pole, hoping, perhaps, that he might be convinced by the arguments made use of by the prelate. So far from this, Pole drew up a treatise, "De Unitate Ecclesiastica," in which he treated Sampson and the king with great harshness, and perhaps indecency. Henry dissembled his anger, and invited him to England, but Pole was much too wary to put himself in his power. The king, thus foiled in his plans, kept no measures with him, but withdrew his pension, alienated his preferments, and caused a bill of attainder to be passed against him. In the mean time pope Paul III. raised him to the cardinalate, and sent him as his nuncio to France and Flanders. He was afterwards employed by the pope in negotiating a peace between the emperor and the king of France, and endeavouring to engage them in a religious war against England. Upon the failure of these designs, he was sent a legate to Viterbo, where he remained till 1543. In that year he was appointed one of the three papal legates to the council of Trent; and when it was actually assembled, he attended upon its deliberations as long as his health would permit. In this council he zealously maintained the doctrine of justification by faith, which was so prominent a feature in the opinions of the reformers, that on this and other accounts he incurred some suspicion of being too favourable to Protestantism, but he had given such decided proofs of his attachment to the papal see, as would not suffer his faith to be doubted. He was therefore confidentially employed in the political affairs of the Roman court during the life of Paul, and at that pontiff's death, in 1549, he was seriously thought of as his successor. He was indeed twice nominated, and at the second time actually waited upon late at night by the cardinals to perform the ceremony of adoration. But some scruples which he manifested on account of the lateness of the hour obliged them to return, and before the morning the cardinals changed their minds, and thus he missed the papal crown, which probably was not very much the object of his desire. After this, for some time, cardinal Pole spent his time in retirement at a monastery of Benedictines, till the death of Edward VI. This event, and the still more important one of the accession of Mary, excited the warmest hopes of the restoration of the Romish religion in England, and cardinal Pole was looked up to as most likely to have effect in producing this change. Mary invited the cardinal to return to England, and he was invested by the pope with the office of legate to the holy see, but the jealousy of the emperor caused obstacles to be thrown in his way, so that he should not arrive till after the marriage of Philip with the queen; Pole himself, who, though a cardinal, was only in deacon's orders, having been thought of for a husband to Mary.

Previously to his arrival, an act of parliament was passed

to reverse the attainder laid upon him by Henry VIII., and in November 1554 he landed at Dover, and was brought to London, where he appeared in his legatine capacity. The cardinal was naturally humane, and became an advocate for lenient measures, in endeavouring to extirpate heresy, in opposition to the infuriate zeal and cruelty of Gardiner. His plans were overruled, and it is certain he afterwards acquiesced in many of the worst acts of this most bloody reign. He was satisfied of the right and obligation of the church to make use of fire and sword to extirpate heresy, and he himself was actually invested with the spoils of the martyred Cranmer. In 1556, having been first ordained priest, he was consecrated archbishop of Canterbury. In the same year he was elected chancellor of the universities of Oxford and Cambridge, both of which he visited by his commissioners, and purged from all stains of heresy. He made some statutes for these seminaries of learning, which greatly increased their reputation. He manfully opposed, though without effect, the queen's design of involving the nation in a war with France, in order to oblige her husband. He was now deprived by the pope of his legatine power, which probably very much affected his spirits, and the death of the queen, that almost immediately afterwards followed this event, with the prospect not only of impending ruin to the Catholic cause, but likewise of retaliation to its zealous adherents, so much affected the cardinal, that either through anxiety or terror, he died a few hours after her majesty, at the age of 58. His body lay forty days in state at Lambeth, after which it was carried in great funeral pomp to Canterbury, and interred on the north side of Thomas à Becket's chapel. Over his grave was erected a tomb, with the following short inscription, *Depositum Cardinalis Poli*. He was, says his biographer, a learned, eloquent, modest, and humble man, of exemplary piety and charity, as well as a generosity becoming his birth. Though by nature he was more inclined to study and contemplation than to active life, yet he was prudent and ready at business, so that he would have been a finished character, had not his superstitious devotion to the see of Rome carried him, against his nature, to commit several cruelties in persecuting the Protestants. After all, he does not appear to have been a man of commanding talents or decision of character, and his reputation has been considerably indebted to his noble birth and rank. His works, which are theological and controversial, are enumerated and described in a note in the article in the *Biographia Britannica*, to which our readers are referred.

POLE, *Polus*, Πόλος; formed from *πολεω*, to turn, in *Astronomy*, one of the extremities of the axis, on which the sphere revolves.

These two points, each 90 degrees distant from the equator, are called, by way of eminence, *the poles of the world*.

Wolfius defines the poles, those points on the surface of the sphere, through which the axis passes; of which that visible to us, or raised above our horizon, is called the *arctic* or *north* pole; and its opposite, the *antarctic* or *south* pole.

POLE, in *Geography*, is the extremity of the earth's axis, or one of the points on the surface of our globe, through which the axis passes. See EARTH.

Such are the points P, Q, (*Plate I. Geography, fig. 9.*) of which that elevated above our horizon is called the *arctic* or *north* pole; and its opposite, Q, the *antarctic* or *south* pole.

Dr. Halley shews, that the solstitial day, under the pole, is as hot as under the equinoctial, when the sun is in the zenith; in regard, all the twenty-four hours of that day

under the pole, the sun-beams are inclined to the horizon in an angle of $23\frac{1}{2}$ degrees; whereas, under the equinoctial, though the sun becomes vertical, yet he shines no more than twelve hours, and is absent twelve hours. Besides, that, for three hours eight minutes of the twelve hours during which he is above the horizon there, he is not so much elevated as under the pole. See HEAT, in *Geography*.

The altitude or elevation of the pole is an arc of the meridian intercepted between the pole and the horizon. To find this elevation is a very popular problem in astronomy, geography, and navigation; this and the latitude of the place being always the same. See ELEVATION of the Pole.

POLE, to observe the Altitude of the. With a quadrant observe both the greatest and least meridian altitude of the pole-star.

Subtract the least from the greatest, and divide the difference by two; the quotient is the star's distance from the pole; which, added to the lesser altitude found, gives the elevation of the pole required. See LATITUDE.

Thus M. Couplet, the younger, at Lisbon, in 1697, in the end of September, observed the greatest meridian altitude $41^{\circ} 5' 40''$; the smallest $36^{\circ} 28' 0''$, the difference of which is $4^{\circ} 37' 40''$; one half of which, $2^{\circ} 18' 50''$, added to the less, gives $38^{\circ} 46' 50''$, the altitude of the pole of Lisbon.

The altitude of the pole, together with the meridian line, being the basis of all astronomical observations; to determine it with the greatest accuracy, the meridian altitude must be corrected from the doctrine of refractions, hereafter to be delivered.

By means hereof, M. Couplet, subtracting $1' 25''$ in the proposed example, leaves the corrected altitude $38^{\circ} 45' 25''$.

Hence, 1. The altitude of the pole being subtracted from 90° , leaves the altitude of the equator.

2. If the greatest meridian altitude of this star exceed the altitude of the equator, the latter, subtracted from the former, leaves the declination of the star northward; if the altitude of the star be less than that of the equator, the former, subtracted from the latter, leaves the star's declination southward.

Dr. Hooke, and some others, imagined the height of the pole, and the position of the circles in the heavens, in respect of those on the earth, to be changed from what they anciently were. But M. Cassini thinks there is no ground for such a surmise; but that all the difference we now find in the latitude of places, &c. in respect of the ancient accounts, arises from the inaccuracies of the ancient observations.

Indeed, it is no wonder they should err in their observations, considering what instruments they used. He adds, it is probable there may be some variations in the height of the pole; but, he thinks, this never exceeds two minutes; and that even this will vanish, after it is arrived to its highest difference.

POLE, in *Spherics*, is a point equally distant from every part of the circumference of a greater circle of the sphere; as the centre is in a plain figure. See SPHERE.

Or, pole is a point 90° distant from the plane of a circle, and, in a line passing perpendicularly through the centre, called the axis.

The zenith and nadir are the poles of the horizon. The poles of the equator are the same with those of the sphere or globe.

POLES of the ecliptic are two points on the surface of the sphere, $23^{\circ} 30'$ distant from the poles of the world,

and 90° distant from every part of the ecliptic. For the true distance of the poles, or measure of the obliquity of the ecliptic; see ECLIPTIC.

POLES, in *Magnetics*, are two points in a loadstone, corresponding to the poles of the world; the one pointing to the north, the other to the south.

If the stone be broken in ever so many pieces, each fragment will have its two poles. If a magnet be bisected by a line perpendicular to the axis, the two points, before joined, will become opposite poles, one in each segment.

To touch a needle, &c. that part intended for the north end is touched with the south pole of the magnet, and that intended for the south end with the north pole.

A piece of iron acquires a polarity, by only holding it upright; but its poles are not fixed, but shift, and are inverted as the iron is. A fixed north pole may be made all the ways a fixed south pole is made; but not *vice versa*: and whatever way we get a fixed south pole, it is always weaker than a fixed north pole got the same way. Fire destroys all fixed poles; but it strengthens the mutable ones.

The end of a rod being heated, and left to cool northward, Dr. Gilbert says, becomes a fixed north pole; if southward, a fixed south pole: yet this doth not hold in all cases. If the end be cooled, held downward, or to the nadir, it acquires somewhat more magnetism than if cooled horizontally towards the north; but the best way is to cool it a little inclined to the north. Repeated ignitions do not avail to this purpose any more than a single one.

Dr. Power says, that if we hold a rod northwards, and hammer the north end in that position, it will become a fixed north pole; and contrarily, if you hammer the south end. What is said of hammering is to be likewise understood of filing, grinding, sawing; nay, a gentle rubbing, provided it be continued long, will produce poles. The more heavy the blows are, *ceteris paribus*, the magnetism will be the stronger. A few hard blows do as much as many.

Old drills and punches have all fixed north poles, because almost constantly used downwards. New drills have either mutable poles, or weak north poles. Drilling with such a one southward horizontally, it is a chance if you produce a fixed south pole, much less if you drill south downwards; but if you drill south upwards, you always make a fixed south pole.

A weak fixed pole may degenerate into a mutable one in a day, nay, in a few minutes, by holding it in a position contrary to its pole. The loadstone itself will not make a fixed pole in any iron. It is required the iron have a length, if it be thick.

Mr. Bailard tells us, that in six or seven drills made before his face, the bit of each became a north pole, merely by hardening. See MAGNET, and MAGNETISM.

POLES, under bare, in *Sea Language*, is the alarming situation of a ship in a storm, when, owing to the violence of the wind, no part of the sails can be set.

POLE of a Glass, in *Optics*, is the thickest part of a convex, or the thinnest of a concave glass.

If the glass be truly ground, the pole will be exactly in the middle of its surface.

This is sometimes also called the *vertex* of the glass.

POLE, in *Surveying*, is a measure containing sixteen feet and a half; called also perch, and sometimes rod. See PERCH.

A woodland pole is 18 feet, a forest or plantation pole is 21 feet, a Cheshire is 24 feet, and a rope is 20 feet.

POLE, in *Agriculture*, a small thick piece of wood, such as a straight bough or young tree. It is useful for various purposes of husbandry, as the making of stakes, hurdles, and

and various other purposes. Many different sorts of wood are used in this intention.

POLE-Axe, a sort of hatchet nearly resembling a battle-axe, used very dextrously by British sailors, having a helve or handle about two feet long, the blade whereof is formed like that of any other hatchet, being furnished with a sharp point or claw, bending downwards from the back of its head.

Some derive its appellation from its being much used in Poland, and say, that its true name is Polish-axe; some again deduce it from its supposed use, which was to strike at the head or poll; and others say it is called a pole-axe, from its being fixed on a long pole or handle. In later times, both battle-axes and pole-axes were more used for the state guards of princes and generals, than for the common purposes of war. The Welch "glaive" is a kind of bill, sometimes reckoned among the pole-axes. They were formerly much in use.

The use of the pole-axe is to cut away and destroy the rigging of the enemy, when endeavouring to board. Sometimes it is successfully used in boarding the enemy, when her sides are above those of the boarder. This is executed when endeavouring to enter at different parts of the ship's length, at which time the pole-axes are forcibly driven into her side, one above another, so as to form a sort of scaling-ladder.

POLE-Cat, *Mustela Putorius* of Linnæus, in *Zoology*, the name by which authors call a creature of the weasel kind, but larger than the common weasel, and remarkable for its stinking smell. It is also called *fitchet*. See *MUSTELA Putorius*.

A method of taking the pole-cat is to set box-traps in the bottom of ditches, or under walls or pales, with the ends of the traps fenced up, for four or five yards *aslant*, and two or three yards wide at the entrance, with earth, bushes, or broken pales, so that the vermin shall not pass without entering the traps. This is the method used by warreners. When the traps are so placed, a trail of rabbits' paunches should be drawn from one trap to another, and the baits are red herrings half broiled. Each end of the traps is to be rubbed with them, and a part of the herring is to be afterwards hung upon the nail over the bridges of the traps. This is a mode that will cause great destruction amongst them. A thin bag, sufficiently large to admit an end of the trap, is to be provided and slipped over it, when any of the traps are sprung, and by rattling at the other end of the trap, the creature will spring into the bag; for without this precaution, if it be a wild cat, the moment the light is admitted, it will fly in the face of the person opening it. By having both ends of the box-traps painted white, and rubbed over with the entrails of any animal, the hares will be deterred from entering, at the same time it will allure the vermin to go into the traps.

POLE-Cat, *American*, or striated weasel of Pennant, the conepate of Buffon, called *skunk*, is the *Viverra putorius* of Linnæus, with rounded ears; head, neck, belly, legs, and tail, black; the back and sides marked with five parallel white lines; one on the top of the back, the others on each side; the second extends some way up the tail, which is long and bushy toward the end. This animal, which is about the size of the European pole-cat, inhabits North America; when attacked, it bristles up its hair, and flings its body into a round form: its vapour is horrid. Pennant. See *VIVERRA Putorius*.

POLE, *Hop*, in *Agriculture*, a sort of pole much used in the cultivation of hops, for supporting the bine. The poles of ash, oak, willow, poplar, chestnut, and various other

sorts of wood, are employed in this way. The ash, oak, and chestnut, are probably the most valuable. In this intention, they are usually prepared by having the bark removed, and being sharpened at the thick end. Great care should be taken of them after they are separated from the bine, by having them properly stacked up in some dry situation. The prices of poles of this sort have lately increased in a high degree.

POLE-Masts, in *Ship Building*, are those made of single trees, in contradistinction to those made of several trees joined together, called "made-masts."

POLE-Star, or *Polar-Star*, is a star of the second magnitude, the last in the tail of *Urfa Minor*, or the *Little Bear*.

The nearness of this star to the pole, whence it happens that it never sets, renders it of great service in navigation, &c. for determining the meridian line, the elevation of the pole, and consequently the latitude of the place, &c.

Mr. Pond, the present astronomer royal, has published a table of the north polar distances of 44 of the principal fixed stars; which table he conceives to be much more accurate than any that has hitherto been offered to astronomers. The maximum of error he thinks seldom exceeds half a second, and only in four cases amounts to one second; *e. gr.* the polar star in summer is $1^{\circ} 41' 22''.07$, and in winter $1^{\circ} 41' 21''.47$ from the north pole of the heavens.

POLE of a Wheel-Carriage. See *PERCH*.

POLEDNISKOI STANITZ, in *Geography*, a town of Russia, in the government of Irkutsk, on the Lena; 12 miles N.E. of Vitimskoi.

POLEGIO, or *POLESE*, a town of Switzerland, in the bailiwick of Riviera; six miles N.N.W. of Bellinzona.

POLEIN, in our *Ancient Customs*, a sort of shoe, sharp or picked at the point.

This fashion was first taken up in the time of king William Rufus; the picks being made so long, that they were tied up to the knees, with silver or golden chains.

They were forbidden by stat. an. 4 Edw. IV. cap. 7. "Tunc fluxus crinium, tunc luxus vestium, tunc usus calceorum cum arcuatis aculeis inventus est." Malmsh. in Will. II.

POLEMARCHUS, *Πολεμαρχος*, among the Athenians, a magistrate who had all the strangers and sojourners in Athens under his care, over whom he had the same authority that the archon had over the citizens.

It was the duty of the polemarchus to offer a solemn sacrifice to Enyalus, said by some to be the same with Mars, but by others to have been only one of his attendants; and another to Diana, surnamed *Αγροτις*, in honour of the famous patriot Harmodius. It was also the business of the polemarchus to take care that the children of those who had lost their lives in their country's service, should have a competent maintenance out of the public treasury. Potter.

POLEMICAL, *Πολημικοι*; from *πολεμος*, *war*, *battle*, an epithet applied to books of controversy, especially those in divinity. Hence also we say, polemical divinity, for controversial, &c.

POLEMO, in *Biography*, an eminent Platonic philosopher, and the third director of the academy, after the death of its founder, was descended from a good family, but in his youth he led a very dissipated life, from which he was suddenly reclaimed in the following extraordinary manner; returning from his revels, one morning, soon after sunrise, in a loose dress, crowned with garlands, and intoxicated with wine, as he passed by the school of Xenocrates, he saw him surrounded by his disciples. He rushed into the school without ceremony, and took a place among the young philo-

philosophers. Astonished at this rude Behaviour, all the assembly shewed signs of resentment, excepting Xenocrates, who went on discoursing to his audience. With the greatest presence of mind, he changed the subject on which he was treating, to those of temperance and modesty, which he recommended with such force of argument, and persuasive eloquence, as flashed instant conviction in Polemo's mind. He felt the folly and criminality of his own conduct, and ashamed of the figure in which he appeared, he took the garlands from his head, drew his cloak about him, and assumed a sedate and thoughtful aspect, and from that moment resolved to renounce his licentious pleasures, and devote himself to the study of philosophy. After this he practised the severest austerities and the most hardy fortitude. From the 30th year of his age to his death he drank only water; upon every occasion he preserved a steady and unmoved gravity of countenance; and that he might, at the same time, keep his mind undisturbed by passion, he accustomed himself to speak in an uniform tone of voice, without elevation or depression. He was, however, possessed of a gentle, obliging, and generous temper, and such was the progress which he made in his philosophical studies, that he surpassed all his fellow disciples in the school of Xenocrates, and on the death of that philosopher, succeeded him in the chair of the academy, about the year 313 B.C. He took great delight in solitude, and passed much of his time in a garden near the school. He died of a consumption, at an advanced age, about the year 270 B.C., highly respected for his great integrity by the Athenians. He was, in his sentiments, a strict adherent to the doctrines of Plato. See PLATONISM. Enfield Hist. Phil.

POLEMONIA, in *Botany*, the eleventh order of Jussieu's eighth class, thus named from one of the best known genera it contains. For the characters of that class, see GENTIANÆ. The order is thus defined.

Calyx divided. *Corolla* regular, five-lobed. *Stamens* five, inserted into the middle of the tube. *Style* one. *Stigma* three-fold. *Capsule* surrounded by the permanent calyx, of three cells and three valves, with many seeds; the partitions from the middle of each valve, meeting the edges of a triangular central receptacle. *Stem* either herbaceous or shrubby. *Leaves* alternate or opposite. *Flowers* terminal or axillary.

The genera in Jussieu are *Phlox*, *Polemonium*, *Cantua* and *Hoitzia*; to which is to be added *Ipomopsis* of Michaux; see that article.

POLEMONIUM, an ancient name, derived from πολέμος, war, because, according to Pliny, book 25, chap. 6, kings had contended for the honour of its discovery. Another of its names, *Philetaria*, has a similar meaning. The inhabitants of Cappadocia, in allusion to its "thousand virtues," called the plant *Chiliodynamia*. Happy should we be to ascertain this inestimable herb! Pliny says, "the root is thick, with slender branches, or twigs, from whose summits hang bunches of black seed. In other respects it resembles rue, and grows on hilly ground." We must be content to describe the *Polemonium* of modern botanists, which answers but very slightly to the account of Pliny, and certainly has no virtues to entitle it to distinguished notice.—Linn. Gen. 87. Schreb. 117. Willd. Sp. Pl. v. 1. 886. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 234. Ait. Hort. Kew. v. 1. 342. Pursh v. 1. 124. Juss. 136. Tourn. t. 61. Lamarck Illustr. t. 106. Gært. t. 62.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Campanacæ*, Linn. *Polemonia*, Juss.

Gen. Ch. *Cal.* Perianth inferior, cup-shaped, of one leaf, divided half way down into five acute segments, permanent. *Cor.* of one petal, wheel-shaped; tube shorter than the

calyx, closed by five valves situated in its upper part; limb five-cleft, ample, nearly flat, the segments roundish and obtuse. *Stam.* Filaments five, inserted into the valves of the tube, thread-shaped, inclining, shorter than the corolla; anthers roundish, incumbent. *Pist.* Germen superior, ovate, acute; style thread-shaped, the length of the corolla; stigma in three revolute segments. *Peric.* Capsule ovate, with three obsolete angles, three cells, three valves, bursting at the top, invested with the calyx; partitions contrary to the valves. *Seeds* numerous, irregular, sharpish.

Ess. Ch. Corolla in five deep segments. Stamens inserted into five valves closing the bottom of the corolla. Stigma three-cleft. Capsule superior, of three cells.

1. *P. cæruleum*. Common Greek Valerian, or Jacob's Ladder. Linn. Sp. Pl. 230. Engl. Bot. t. 14. Fl. Dan. t. 255. (*Valeriana græca*; Ger. Em. 1076.)—Leaves pinnate, with numerous leaflets. Flowers erect.—Native of woods, in the mountainous parts of Europe, and the north of Asia. It is perennial, flowering in June, and forms the frequent decoration of many a country garden. The English name, like the Latin or Greek one, is founded in confusion and error, for the plant is not known in Greece, nor has it any thing in common with Valerian, except the pinnated leaves. The root is fibrous. Herb smooth, two feet high, paniced and leafy, not branched. Flowers numerous, terminal, of a delicate purplish blue, often varying to white, each about an inch wide. Gmelin, in his Fl. Sibirica, v. 4. t. 50, has figured a downy variety.

2. *P. reptans*. Creeping Greek Valerian. Linn. Sp. Pl. 230. Willd. n. 2. Ait. n. 2. Pursh v. 1. 151. (*Polemonium*; Mill. Ic. v. 2. t. 209.)—Leaves pinnate, with about seven leaflets. Flowers drooping. Root creeping. Native of North America, from Pennsylvania to Carolina, on the sides of rich hills, flowering in April and May. Miller cultivated this species, and it is preserved, for variety's sake, in curious gardens, but it yields to the former in beauty. The chief difference consists in the creeping root, more lax and spreading habit, fewer leaflets, and drooping flowers. The colour of the corolla, naturally a light blue, often varies to white.

These two are the only certain species. *P. dubium*, Linn. Sp. Pl. 231, is *Phacelia parviflora*, Pursh v. 1. 140; a small annual plant, found on rocks in Virginia; see PHACELIA. *P. Nyctelea*, Linn. Sp. Pl. 231, is ELLISIA; see that article. *P. roelloides* and *campanuloides*, Linn. Suppl. 139, are two Cape plants, imperfectly known to us, which have no appearance of belonging to *Polemonium*, but rather to *Campanula*, or some of its allies.

POLEMONIUM, in *Gardening*, contains plants of the fibrous-rooted, herbaceous, flowering, perennial kind, of which the species cultivated are, the common polemonium (*P. cæruleum*); and the creeping polemonium, or Greek valerian (*P. reptans*).

There are varieties of the first sort with white flowers, with variegated flowers, and with variegated leaves.

Method of Culture.—These plants may be increased by seeds, and parting the roots in both the sorts.

The seeds should be sown in the spring, upon a bed of light earth, and when the plants are pretty strong, they should be pricked out into another bed of the same earth, four or five inches asunder, shading and watering them until they have taken new root; keeping them clear from weeds until the beginning of autumn, and then transplanting them into the borders of the pleasure-ground. The plants are not of long duration; but by taking them up in autumn, and parting their roots, they may be continued some years; but

but the seedling plants flower stronger than those from offsets.

The varieties can only be continued by parting the roots at the above season. They should have a fresh light soil, which is not too rich, as the roots will be apt to rot in winter, and the stripes on the leaves to go off.

The second sort may be increased by feeds or offsets in the same manner, and is equally hardy, but much less beautiful.

They afford ornament among flowery plants in the borders and other parts.

POLEMOSCOPE, in *Optics*, an oblique kind of perspective glass, contrived for the seeing of objects that do not lie directly before the eye.

It was invented by Hevelius in 1637, who gave it this name, from the Greek *πολεμος*, *battle*; because it may be of use in war, in engagements, duels, &c. for discovering what the enemy is doing, whilst the spectator lies hid behind any obstacle.

Of this kind, are those now known among us under the name of ogling-glasses, or opera-glasses, through which one sees a person, in appearing to look at another.

POLEMOSCOPE, *Construction of the*. Any telescope will be a polemoscope, if the tube be but crooked, like a rectangular siphon A B D M (*Plate XVII. Optics, fig. 12.*), and between the object-glass A B, and the first eye-glass G H, (if there be several,) be placed a plain mirror, in such manner as that the mirror is inclined to the horizon at an angle of 45°, and its reflected image found in the focus of the eye-glass G H.

For, by this means, objects, situated over-against the lens A B, will appear the same as if the mirror K were away, and the object glass, with the objects, were directly opposite to the eye-glasses.

If it be desired to look in an O, not at M, another plain mirror, N, must be added.

POLENI, JOHN, marquis, in *Biography*, a learned mathematician, who flourished in the 18th century, was born at Padua in the year 1683. He was appointed professor of astronomy and mathematics in the university of his native city, and filled that post with high reputation. In three instances he gained prizes from the Royal Academy of Sciences, and in 1739 he was elected an associate of that body. He was also a member of the academy of Berlin, a fellow of the London Royal Society, and a member of the Institutes of Padua and Bologna. As he was celebrated for his skill and deep knowledge of hydraulic architecture, he was nominated by the Venetian government, superintendant of the rivers and waters throughout the republic; other states also applied to him for advice, in business belonging to the same science. He had paid particular attention to the study of civil architecture. During the pontificate of Benedict XIV., he was sent for to survey the state, of which fears were entertained, of St. Peter's church at Rome. After a minute examination, he drew up a memoir on the damages which the church had sustained, and the repairs proper to be undertaken. He died at Padua in 1761, at the age of 78. He was distinguished by a lively penetrating genius, profound scientific knowledge, and an excellent memory. He held a correspondence with the most distinguished mathematicians of the age, *viz.* with sir Isaac Newton, Leibnitz, the Bernouillis, Wolff, Cassini, Gravefande, Muschenbroeck, Fontenelle, and others. The marquis did not, however, confine his studies to the mathematical sciences properly so called: he was a zealous, intelligent, and industrious antiquary; and the learned world is indebted to him for a valuable supplement to the grand col-

lections of Grævius and Gronovius, in this department, consisting of five vols. folio.

POLENKA, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 35 miles S. of Novogrodek.

POLESCHOWITZ, a town of Moravia, in the circle of Hradisch; six miles S.W. of Hradisch.

POLESIA, a name given to the palatinate of Brsefskie, or Brzesk; which see.

POLESINO de Rovigo, a province of Italy, situated between the Ferrarese and Paduan, 42 miles long and 12 broad, encompassed or intersected by the Po and Adige. The soil is generally rich and fertile, the marshy parts excepted, but the arable land is, in some places, lower than the bed of the Adige, which occasionally breaks through its dikes, and inundates the country, thus favouring the culture of rice. This district abounds in corn, maize, flax, hemp, fruit, and silk; and by means of its luxuriant pasture grounds, the breeding of black cattle, and of horses, is in a prosperous state. In the time of the Romans, this territory was thinly inhabited, and was known by the appellation of the "Adrian Marshes," or "Paludes Padusæ," from their extending to the district of Padua. After passing under the dominion of several masters, the Polesin of Rovigo was at length appropriated by the state of Venice, in consequence of the treaty of peace concluded in 1484. The part of the Polesin, situated on the right bank of the river, contains 3 towns, 1 borough, 55 villages, and about 9000 inhabitants. The chief place is Rovigo.

POLETA, in our *Ancient Law Books*, signifies the ball of the foot. "Tres ortilli scindantur de pede anteriori sine poleta." Matt. Par. anno 1215.

POLETÆ, *Πολεταί*, among the Athenians, ten magistrates, who, together with three that had the care of the money allowed for shows, had the power of letting out the tribute-money, and other public revenues, and selling confiscated estates; all which bargains were ratified in the name of their president. Besides this, it was their office to convict such as had not paid the tribute called *Μετρίκιον*, and sell them by auction. Potter.

POLETO, in *Geography*, a town of Italy, in the department of the Mincio; 12 miles E.S.E. of Mantua.

POLEY-GRASS, in the Linnæan system of *Botany*, is a species of lythrum.

POLEY-Mountain. See **TEUCRIUM**.

Several species and varieties of polium, erect and procumbent, with white, yellow, and purplish flowers, have been received in the shops. But the poley-mountain of Candy has been commonly understood as the officinal sort, which is procured dry from the island Candy; and the poley-mountain of Montpellier is allowed to be of the same quality. The leaves and tops have a moderately strong aromatic smell, and a disagreeable bitter taste; they are recommended as corroborants, aperients, and antispasmodics; but are at present scarcely otherwise made use of than as an ingredient in mithridate and theriaca. Lewis.

POLGHA, a name by which some authors have called the cocoa-nut tree, or palma Indica nucifera of other writers.

POLHEM, CHRISTOPHER, in *Biography*, a celebrated Swedish engineer, descended from an Hungarian family, was born at the town of Visby in 1661. By the death of his father he was left, at a very early age, without any other resource than what he might derive from his own talents. For some years he found employment as a clerk, or collector of rents, but having a strong turn for mechanics, he employed all his leisure time in studying the principles of that science. He also established a carpenter's, turner's, and

and smith's shop, and manufactured a number of curious and useful articles, as jacks, clocks, dials, &c. He took great pains to acquire a knowledge of the Latin language, and when he had made some progress in it he was admitted to the university of Upsal. After remaining there some time he proceeded to Stockholm, with the view of getting employment as a surveyor. He found himself unable to pass the examination necessary for the office, and returned to Upsal, where he renewed his studies with so much diligence, that he was shortly qualified to overcome every obstacle to his wishes. In 1690 he constructed for the royal college of mines, the model of an ingenious machine applicable to mining purposes, which afforded a striking proof of his extraordinary genius and talents. As a reward for this service, Charles XI. gave him a pension of 500 silver dollars *per annum*, and appointed him an engineer of the mines. In 1694 he set out on a foreign tour, for the purpose of improving himself in mechanical knowledge, and at Paris constructed a clock which indicated the Turkish, Jewish, Babylonian, and other hours, according to the mode of reckoning time adopted by the different nations of Europe. After this, he invented various machines, all of which were adapted to purposes of utility, and did great credit to his genius and talents. In 1707 he was invited by the elector of Hanover, afterwards George I., to visit that country, that he might improve the machinery in the mines of Hartz forest; he was urged to remain here, but his attachment to his native country induced him to decline the offer. In 1712, he began at Carlscrona the celebrated docks, hollowed out with immense labour in the solid rock, which are still the admiration of travellers, and about the same time he undertook the canal of Trollhetta, which formed part of a plan, long projected by the Swedes, of uniting the Baltic and German ocean by an inland navigation, not only to improve the interior trade, but to prevent that interruption to their foreign commerce which is always the consequence of a war with Denmark. In 1716 Polhem was ennobled, and in the same year was appointed a member of the council of commerce; for his patriotic views were directed also to the improvement of the Swedish manufactures, and every thing connected with that branch of industry. He was a great improver of the machinery used in the manufacture of iron, steel, copper, and brass; he carried the woollen trade to a high degree of perfection, and enriched every part of domestic economy with new and useful inventions. In early life he had to struggle with a great variety of obstacles, but in its later periods he met with the rewards due to his merit. In 1748, he was appointed a knight and commander of the order of the Polar star. He was one of the most distinguished members of the Royal Academy of Sciences at Stockholm, and contributed many valuable papers to its Transactions. Polhem died in 1751, in the ninetieth year of his age. The following works are referred to as containing an account of some of his machines. "A Short Description of the principal mechanical Inventions of C. Polhem, with cuts;" and "Swedenborg's Dædalus Hyperboreus." Gen. Biog. Coxe's Travels in Russia and Sweden.

POLI, in *Geography*, a town of Campagna di Roma; three miles N. of Palestrina.

POLIA, in *Botany*, *πολια*, hoary, in allusion to its white aspect, Lourei. Cochinch. 164, is our *Hagea indica*. See HAGEA.

POLIA *Lithargirus*, a term used by Dioscorides to express the white litharge, which we call litharge of silver.

The proper sense of the word *polia*, is hoary, or grey, and it very well expresses the colour of this substance; but the commentators have not been satisfied with this obvious

meaning, but have made it *pelia*, and some of them *scelia*. See LITHARGE.

POLIANTHES, in *Botany*, a name given by Linnæus, and therefore we must accept his own explanation of it, which is, "*πολις*, a town, and *ανθος*, a flower;" because this plant is so generally cultivated and sold in towns, for the sake of its elegance and fragrance. The French know the flower by the name of Tubereuse; the English call it Tuberose; both words taken from the Latin appellation which it first obtained, of *Hyacinthus tuberosus*. Some write *Polyanthes*, as Linnæus originally printed the generic name; and suppose the etymology to be from *πολυς*, many; but the abundance of flowers is not such as to countenance this explanation.—Linn. Gen. 169. Schreb. 225. Willd. Sp. Pl. v. 2. 164. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 281. Juss. 56. Lamarck Illustr. t. 243.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Coronarie*, Linn. *Narcissi*, Juss.

Gen. Ch. *Cal.* none. *Cor.* of one petal, inferior, funnel-shaped; tube oblong, incurved; limb in six ovate, spreading, equal segments. *Stam.* Filaments six, thick, obtuse, erect, at the top of the tube; anthers linear, longer than the filaments. *Pist.* Germen roundish, in the base of the tube; style thread-shaped, rather shorter than the corolla; stigma three-cleft, thickish, bearing honey. *Peric.* Capsule roundish, with three blunt angles, wrapped up in the lowest part of the corolla, of three cells and three valves. *Seeds* numerous, flat, semicircular, disposed in double rows.

Ess. Ch. Corolla funnel-shaped, incurved; its limb in six equal segments. Filaments inserted into the mouth of the tube, erect. Capsule invested with the base of the corolla.

1. *P. tuberosa*. Common Tuberose. Linn. Sp. Pl. 453. Willd. n. 1. Ait. n. 1. Redout. Liliac. t. 147. (*Hyacinthus indicus, tuberosa radice*; Clus. Hist. v. 1. 176. *H. indicus, tuberosus*; Ger. Em. 115. Rudb. Elyf. v. 2. 38. f. 3. 39. f. 4. *Amica nocturna*, or Sandal Malam; Rumph. Amboin. v. 5. 285. t. 98.)—The only known species, of which Rudbeck figures a larger and a smaller variety. It is usually supposed to be a native of the East Indies, but Redouté has lately advanced some reasons for believing it originally came from South America. Simon de Tovar communicated the Tuberose to Clusius, in 1594, as an "Indian plant;" which vague expression may as well refer to the West as the East Indies. The authors of the *Flora Peruviana* mention it as wild in Peru; while, on the other hand, Rumphius relates, that it was unknown in Amboina before the year 1674, having been carried thither from Batavia. It is very likely to have been transported from Holland to the latter settlement. Father Minuti is however recorded by Plumier, Nov. Gen. 35, as having brought this plant from the East Indies, to the south of France; but this was not less than fifty years after Clusius had obtained his. Its constitution is more like a Peruvian plant, than one of Ceylon or Java. In the south of France the roots increase and blossom freely, and the north of Europe has usually been supplied every year from that country, or from Italy and Portugal, with such as were fit for planting in pots, or for forcing; that being the only means of having good flowering plants in England, notwithstanding what has sometimes been related on the subject. The root is perennial, tuberous, somewhat creeping. *Stem* simple, erect, round, leafy, a yard or more in height. *Leaves* scattered, linear-lanceolate, taper-pointed, sheathing, smooth, pale, and rather glaucous. *Flowers* several, in a terminal, oblong, bracted spike. Their colour is white, sometimes tinged with a blush of pink; their odour rich

and delicious, most powerful at night, resembling the flavour of ginger, with great sweetness. The double-flowered variety is most esteemed.—Linnæus originally referred his *Crinum africanum*, now *Agapanthus umbellatus*, to this genus. Willdenow has a *Polianthes pygmæa*, which is our *Maffoni ensifolia*. See MASSONIA.

POLIANTHES, in *Gardening*, contains plants of the bulbous-tuberous rooted, herbaceous, flowering, perennial, exotic kind, of which the species cultivated is the tuberose, or Indian tuberous hyacinth (*P. tuberosa*).

There are varieties of this with a double flower, with striped leaves, and with a smaller flower. The last is frequent in the south of France, whence the roots have been often brought here early in the spring, before those roots have arrived from Italy, which are annually imported; the stalks of it are weaker, and do not rise so high, and the flowers are smaller than those of the common sort, but in other respects it is the same.

The Genoese are the people who cultivate this plant to furnish all the other countries where the roots cannot be propagated without great trouble and care, and thence the roots are annually sent to this and other countries. In most parts of Italy, Sicily, and Spain, the roots thrive and propagate without care where they are once planted.

It has been long cultivated in this country for the exceeding beauty and fragrantcy of its flowers.

Method of Culture.—These plants are chiefly increased by offsets from the roots.

The blowing roots that are annually brought from abroad, for sale, are mostly furnished with offsets, which should be separated previously to planting; those also raised here in the garden are frequently furnished with offsets, fit for separation in autumn, when the leaves decay. They should be preserved in sand during the winter, in a dry sheltered place; and in the beginning of the spring, as March, be planted out either in a bed of light dry earth in the full ground, or, to forward them as much as possible, in a moderate hot bed, sheltering them in cold weather either by a frame and lights or with mats on arched hoops, letting them enjoy the full air in mild weather, giving also plenty of water in dry seasons during the time of their growth in spring and summer.

They should remain in this situation till their leaves decay, in autumn; then they should be taken up, cleaned from earth, and laid in a box of dry sand, to preserve them till spring following, at which time such roots as are large enough to blow may be planted and managed as directed below, and the smaller roots planted again in a nursery-bed, to have another year's growth; afterwards planting them out for flowering.

The roots of these plants are mostly sold at the rate of about twelve or fifteen shillings *per* hundred, care being taken always to procure as large roots as possible, as on this depends the success of having a complete blow.

In order to blow them in a perfect manner, they require artificial heat in this climate, and should be planted in pots, and plunged in a hot-bed, under a deep frame, furnished with glass lights; or placed in a hot-house, where they may be blown to the greatest perfection, with the least trouble.

The principal season for planting them is as above; but in order to continue a long succession of the bloom it is proper to make two or three different plantings, at the interval of about a month.

Where dung hot-beds are employed, six inches depth of earth, or old tan, should be laid, in which to plunge the pots; but if bark or tan be used, no earth is necessary, as

the pots may be plunged immediately into the bark. Having the hot-beds ready, and the roots provided, and some proper sized pots, twenty-fours, one for each root, fill the pots with light rich earth; and after having divested the roots of all loose outer skins, and all offsets, plant one in each pot, in depth, so as the top of the root be about an inch below the surface of the earth, plunging all the pots in the hot-bed close together, or so that the bed may contain the number required; and as soon as they are all thus placed, put on the lights of the frame.

In the hot-house method, the pots of roots, as above, should be plunged to their rims in the bark-bed, or placed in the front part of the house; but the former is the better method.

They afterwards require to have a portion of fresh air daily admitted, by tilting the upper ends of the lights, keeping them close down in the night; also moderate waterings, which however should be applied very sparingly, till the roots begin to shoot, when repeat them moderately as occasion may require, taking care when the shoot begins to advance to admit fresh air more freely, in proportion, to strengthen the stems, according as they advance in height; and when they have risen near the glasses, it is proper to deepen the frame, either by the addition of another at top, or by raising it at bottom six or eight inches, in order to give the stems sufficient room to shoot to their full stature, repeating this once or twice, as the growth of the plants renders it necessary, still assisting them with plenty of water, and a large portion of fresh air daily, either by raising one end of the lights as above; or when the plants are advanced some tolerable height, and in the warm season the lights may be taken away entirely, occasionally, in fine mild days, which will strengthen and inure them gradually to the full air: but always draw on the lights again towards the evening, or at the approach of a sharp air, cold blasts, or heavy rains; but as the summer approaches begin to expose them fully, only giving occasional shelter in cold nights or very wet weather, either by the glasses, or mats supported on hoop arches, till they begin to flower, which will be about the middle or latter end of June, or beginning of July; when the plants in their pots may be removed where wanted; either to adorn any of the garden compartments, or any apartment of the house, a tall straight stake or stick being placed to each plant to fasten the stem to, for support.

The plants must still be duly supplied with water all the time of their bloom, as every other day, or oftener, in very hot dry weather.

Sometimes roots, when planted in May in the full ground, will shoot tolerably strong, and produce flowers in autumn.

They are highly ornamental, but especially the single and double sorts, among other tender potted plants. The dwarf and variegated sorts also afford a fine variety.

POLICANDRO, in *Geography*, an island in the Grecian Archipelago, about seven or eight leagues distant from the isle of Milo. It formerly bore the name of "Pholegandros," and to this the poet Aratus adds the epithet *ferrea*, thus by a single word suggesting an idea of its soil, which is rugged, stony, and, as it is were, composed of iron. The coast affords no harbour; its population is not numerous, and confined in a village enclosed by walls, near which rises a rock of tremendous aspect. Its vines yield good wine; but agriculture finds few spaces fit for cultivation. Some few districts yield corn and cotton, and with the latter commodity tolerably fine cloths are manufactured. Game delights in this rugged soil, and birds of passage make it their principal rendezvous in their regular migrations. N. lat. 36° 37'. E. long. 24° 59'.

POLICANY, a town of Lithuania, in the palatinate of Braflaw; 21 miles S.W. of Braflaw.

POLICASTRELLA, a town of Naples, in Calabria Citra; 15 miles N.W. of Bisignano.

POLICASTRO, a town of Naples, in Principato Citra, on the coast of the Mediterranean, the see of a bishop, suffragan of Salerno; 80 miles S.S.E. of Naples. N. lat. $40^{\circ} 8'$. E. long. $15^{\circ} 30'$.—Also, a town of Naples, in Calabria Ultra; nine miles W.S.W. of St. Severina.—Also, a town, called “Paleo-Castro,” on the N. coast of the island of Candy; 15 miles E.S.E. of Settia.

POLICE, not improbably from *πολις*, a city. The term public police and economy is applied by Blackstone to signify the due regulation and domestic order of the kingdom: but is more generally applied to the internal regulations of large cities and towns.

The police of the metropolis is a system highly interesting to be understood; but the vast proportion of those who reside in the capital, as well as the multitude of strangers who resort to it, have no accurate idea of the principles of organization, which move so complicated a machine.

That part of the system, which may be denominated municipal police, and which consists of paving, watching, lighting, cleansing, and removing nuisances, is chiefly under the management of parochial commissioners.

To administer that branch of the police, which is connected with the prevention, suppression, and punishment of crimes, twenty-six magistrates, namely, the lord mayor and aldermen, sit in rotation every day, and take cognizance of all complaints arising within the jurisdiction of the city of London.

For every other part of the metropolis twenty-seven stipendiary magistrates are appointed; three at Bow-street, Covent Garden, under a jurisdiction long established, and twenty-four by 32 stat. Geo. III. cap. 53. (generally called the Police Act), extended and enlarged by subsequent acts.

These twenty-four have eight different offices assigned to them at convenient distances in Westminster, Middlesex, and Surrey, *viz.* one in Queen-square, Westminster; one in Great Marlborough-street; one in Hatton-garden; one in Worship-street, Shoreditch; one in Lambeth-street, Whitechapel; one in High-street, Shadwell; one in Union-street, in the borough of Southwark; and one in Wapping; which last is under a separate act of parliament, and the attention of the magistrates there is almost entirely confined to the cognizance of offences, either committed on the river Thames, or connected with maritime affairs.

The duty of the magistrates at these offices extends to several important judicial proceedings, where, in a variety of instances, they are empowered and required to hear and determine in a summary way, particularly in cases relating to the customs, excise, coaches, carts, pawn-brokers, persons unlawfully pawning the property of others, and a variety of other matters under penal statutes.

Their duty also extends to many other objects, such as in considering the cases of persons charged with being disorderly, persons brought for examination under charges of treason, murder, felony, frauds, and misdemeanors of every description,—all which unavoidably impose upon every magistrate a weight of business, requiring great exertion and attention to the public interest in the due execution of this important trust.

At each of these offices there are three magistrates established, two of them attend every day except Sunday, and one every evening; two clerks, an office-keeper, a mes-

senger, and from eight to twelve constables, are also attached to each. The Thames police, from the nature of the duty, has a considerable number of constables, surveyors, watermen, and watchmen.

The establishment of the public office in Bow-street is upon a more enlarged scale than any of the others; besides the usual number of constables, there are one hundred foot patrols under proper conductors, who perambulate every evening the environs of the metropolis for two or three miles outwards; and there are also forty horsemen, who go a farther distance of from ten to fifteen miles on the roads leading into London: both these are armed, and are under the direction of the chief magistrate of Bow-street.

POLICHNA, in *Ancient Geography*, a town of Asia Minor, in the Troade, near Palæcepsis, on the summit of mount Ida. Strabo.—Also, a town of the Peloponnesus, in the Argolide, which, according to Polybius, was taken by Lycurgus.—Also, a town of the island of Crete.—Also, a small town of the island of Chios.—Also, a town of Sicily, in the vicinity of Syracuse. Diod. Sic.

POLICOLE, in *Geography*, a town of Hindoostan, in the circar of Ellore; 40 miles N.E. of Masulipatam.

POLICORN, a mountain of Naples, in Abruzzo Ultra; 15 miles S. of Lanciano.

POLICY, or **POLITY**, *Πολιτεία*, the laws, orders, and regulations, prescribed for the conduct and government of states and communities.

The word is of Greek original, being derived from the Greek *πολις*, *civitas*, *city*, or *state*.

In the general, policy is used in opposition to barbarism. Different states have different kinds of policy: thus the policy of Athens differed from that of Sparta.

Loyseau observes, that policy properly signifies the course and administration of justice in a city. The direction of the policy of London is in the hands of the lord mayor.

At Paris they have a *chamber of policy*, where people are verbally accused for contraventions of policy.

Some divide policy into two parts, *agoranomy*, that relating to affairs of merchandize; and *astynomy*, that concerning the civil and judiciary government of the citizens. Some add a third branch, *viz.* what relates to the ecclesiastical government.

Richard Hooker has a fine treatise of the laws of ecclesiastical policy.

In much the same sense is used the modern term *police*, or *public economy*, to denote the due regulation and domestic order of the kingdom: by which the individuals of the state, like members of a well governed family, are bound to conform their general behaviour to the rules of propriety, good neighbourhood, and good manners; and to be decent, industrious, and inoffensive, in their respective stations. The class of crimes against the public police of a country comprehends those which amount to felony, as clandestine marriages, bigamy, and polygamy: those of idle foldiers and mariners, wandering about the realm, and gypsies; and others, whose punishment is short of death, as common nuisances, idleness, luxury, gaming, and the destroying of game. See **POLICE**.

POLICY of Insurance, or *assurance of ships*, is a contract or convention in writing, by which a person takes upon himself the risks of a sea-voyage; obliging himself to make good the losses and damages that may befall the vessel, its equipage, tackle, victualling, lading, &c., either from tempests, shipwrecks, pirates, fire, war, reprisals, &c. in part or in whole, in consideration of a certain sum of seven, eight,

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eight, or ten *per cent.* more or less, according to the risk run; which sum is paid down, or supposed to be paid, to the insurer by the insured, upon his signing the policy.

The origin of these insurances has been erroneously ascribed to the Jews, at the time they were expelled France, in 1182; who are said to have used this as a means to facilitate the transporting of their effects. (For the history and practice of *MARINE INSURANCES*, see that article.) The term policy is said to be Spanish, and to be derived from *poliça, schedule*; but the practice comes from the Italians and the Lombards; who, again, derived it originally from the Latin *pollicitatio, promise*. Some writers have deduced the term *policy* from the Italian, “*polizano di assicurazione*,” or “*di securanza*,” or “*di securta*,” which signifies in that language a “note or bill of security,” or indemnity. Some say the merchants of Marseilles were the first who set on foot this kind of commerce.

Anciently policies were given by word of mouth, called *policies of credit*; it being supposed the insurer would enter them in his ledger; but of late, they have been made constantly in writing.

Policies, with reference to the *reality of the interest* of the insured, are distinguished into *interest* and *wager* policies. With reference to the *amount* of the interest, they are distinguished into *open* and *valued*.

An *interest* policy is where the insured has a real, substantial, assignable interest in the thing insured; in which case only it is a contract of indemnity.

A *wager* policy is a pretended insurance, founded on an ideal risk, where the insured has no interest in the thing insured, and can therefore sustain no loss by the happening of any of the misfortunes against which the insurance is made. Insurances of this sort are usually expressed by the words “interest, or no interest,” or “without further proof of interest than the policy,” or “without benefit of salvage to the insurer.” An *open* policy is where the amount of the interest of the insured is not fixed by the policy; but is left to be ascertained by the insured, in case a loss should happen. A *valued* policy is where a value has been set on the ship or goods insured, and that value inserted in the policy, in the nature of liquidated damages, in order to save the necessity of proving it, in case of a total loss; for by allowing the value to be thus inserted in the policy, the insurer agrees, that it shall be taken as there stated. This value is, or ought to be, the real value of the ship, or the prime cost of the goods, at the time of effecting the policy. Cases, however, may occur, in which it is difficult to fix the value of the thing insured at the time, when it is necessary to make the insurance; and in such cases, the insured must fix a value according to his best means of ascertaining it; and hence it is become customary to insert a clause of valuation in the policy, which specifies a given sum as the value of the thing insured. The value in such policy should be only the prime cost. If the thing insured be undervalued, the merchant himself runs the risk of the deficiency: but if it be much overvalued, it must be done with a bad view; either to a fraudulent loss, or to game contrary to the statute 19 Geo. II. c. 37. Upon a valued policy, the insured needs only to prove *some* interest, the amount being admitted. But though a *valued* policy is distinguishable from a *wager* policy in this, that the former is founded on real interest, the amount of which is agreed by the policy, in the latter the insured has avowedly no interest at all; yet it must be owned, that a *valued* policy evidently partakes of the nature both of a policy on interest and of a wager. It

supposes on the one hand a *bonâ fide* interest in the insured, and on the other, this interest is not always expected to be exactly commensurate with the amount of the insurer's obligation. There is, indeed, a real interest; but this frequently falls short of the nominal value in the policy; and it too often happens, that wager policies are effected under colour of a small interest, and in the form of valued policies, and thus the beneficial effects of the stat. 19 Geo. II. c. 37. are defeated: the value in the policy ought, therefore, only to be considered as *prima facie* evidence of the interest of the insured, and may be disputed by the insurer. With us in England, if a valued policy be meant as an indemnity, the amount of the valuation will not be very scrupulously investigated; but if the interest proved be a mere cover for a wager, the policy will be void. The only difference between an *open* and a *valued* policy is in the case of a total loss. In the former the value must be proved; in the latter it is admitted. But in the case of a partial loss, the like inquiry into the true amount of such loss is to be made, whether the policy be open or valued. The business of insurance, and of getting policies effected, is usually transacted by persons who make this their profession, or who are called *Insurance Brokers*. See that article.

The form of the policy, similar to that now in use, was probably introduced into England by the Lombards; and it has continued without any very material alteration. This instrument is always construed by courts of justice according to the intention of the parties, and so as that the indemnity of the insured, and the advancement of trade, which are the great objects of insurance, may be attained. The construction should also be conformable to the course of the trade in the place where the insurance is made. In case of doubtful or obscure clauses, the interpretation should be according to the rules of the common law, because the parties must be presumed to make their agreements subject to that law.

The usual requisites of a policy are ten; and they are as follow. The *first* is the name of the insured, his agent or trustee. Inconvenience having been experienced from having marine insurances in blank, as to the name of the insured, which used formerly to be the case, the utility of the contrary practice was suggested about the year 1785; and the legislature was induced, with a view of remedying these inconveniences, to pass the stat. 25 Geo. III. c. 44. which directs, that where the insured resided in Great Britain, his name, or that of his agent, should be inserted in the policy, as the person interested; and where he resided abroad, the name of his agent should be inserted. This act, however, was repealed by the stat. 28 Geo. III. c. 56, which provides, that the names or firm of the persons interested, or the name of one of them, or the name of the person who gives or receives the order to insure, shall be inserted. This act ought to be construed liberally and according to its true intent and meaning; and, therefore, if a consignee refuse to accept a cargo of goods, or to accept bills of exchange for the amount, the general agent of the consignor becomes in effect the consignee, and may insure in his own name. A general agent may insure without an order for that purpose, when it is for the interest of his correspondent that he should do so. A debt, which would have given a “lien” on the thing insured, gives an insurable interest; and a contingent and reasonable expectation of interest is sufficient to entitle the party to insure. If the name of the broker effecting the policy be inserted in it, it is a sufficient compliance with the 28 Geo. III. c. 56, though he be not described therein as an agent; so,

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though it should appear that the agent named in the policy be not *general* agent, but only agent for that particular purpose.

The *second* requisite is the insertion of the names of the ship and of the master. In a policy on goods the ship must be named; and the ship cannot be changed, but from necessity, or with the consent of the insurer. It often happens, however, that, in the trade carried on with distant countries, particularly in time of war, it is uncertain by what ships goods may be sent from thence to Europe. It is, therefore, of great importance to the merchant to be at liberty to avail himself of the first vessels that may offer for that purpose, and to make his insurance on the goods on board such vessels; and in such case, the policy is upon the goods, "on any ship or ships;" and this is now so well established, both by usage and authority, that the legality of it is indisputable. It is necessary also that the *species* of the vessel should be truly named: accordingly if the ship be a privateer or letter of marque, she should be described as such. The name of the *master* must likewise be specified: but the owner may change the master, so that the following words are always added in our policies, "or whosoever else shall go for master in the said ship;" but this ought not to be done unnecessarily.

The *third* requisite is the subject matter of the insurance, whether it be goods, ships, freight, respondentia, bottomry securities, or other things. There are, however, certain articles, which, though they may properly be called goods, are not comprehended under the general denomination of goods, wares, and merchandizes in the policy; and therefore the insurer is not liable for any loss upon these articles, unless they be specifically named: such are the master's clothes, and the ship's provisions. Neither are goods lashed to the deck comprehended under the name of goods, unless they be particularly described, because they are exposed to greater danger than goods usually are, and consequently the premium for insuring them is greater. Money, jewels, or bullion, may be insured under the denomination of goods; but the insurance is not liable for the risk of a clandestine exportation of these articles. A distinction has been generally made between money, jewels, rings, trinkets, &c. which are a part of the *cargo*, as articles of commerce, and such as are merely *personal*, and are not meant to be disposed of as such. The jewels and ornaments which are worn by persons on board, and which are not considered as forming part of the cargo, nor liable to contribute to a general average, would not be considered as included in a general policy on goods. An insurance on a ship does not comprehend both ship and cargo: and, therefore, if a merchant insure a ship generally, and she then happen to be laden, the insurer, in case of loss, shall answer only for the ship, but not for the goods.

The *fourth* requisite in a policy is a description of the voyage, with the commencement and end of the risk. This is of such importance, that if a blank be left either for the place of departure or of destination, the policy will be void. In our ordinary policies, the continuance of the risk on goods is generally expressed to be "from the loading thereof on board the ship," and to continue "until the same be discharged and safely landed" at the port of delivery. Upon the *ship*, on an outward voyage, it is sometimes from "her beginning to load" at some particular place, or "at and from" such place; sometimes "from a particular day." On a homeward voyage, it is generally made to commence "on the ship's arrival" at a particular place abroad, or at and from such place; and it continues "till

she arrives" at her place of destination, "and is there moored twenty-four hours in good safety." A ship is enabled, by certain additional provisions, to touch, stay, trade, &c. at certain places out of the direct course of the voyage, without incurring the guilt of a deviation. Privateers and vessels which are constantly employed in the coasting trade, are insured sometimes for a term; but by stat. 35 Geo. III. c. 63. §. 12. this term must not exceed 12 calendar months; if it exceed that time, the policy will be void.

In policies for time the commencement and termination of the time should be distinctly specified; but if these should not be precisely stated, it will be sufficient if it can be collected from the construction of the policy and the intention of the parties. If the port or ports of the ship's destination be untruly set forth in the policy, the contract will be void, whatever may have been the original *intention* of the insured at the time when the insurance was effected; if, in fact, the ship sail on a voyage different from the voyage insured, the policy is discharged; not, perhaps, on the ground of a wilful misrepresentation, but because the ship never sailed on the voyage described in the policy, and there is no inception of the risk insured against. But it has been holden, in a subsequent case, that though there be a *previous design* to touch at a port out of the usual course of the voyage insured, and the ship be even furnished with clearances for that port; yet, if the "termini" of the intended voyage be the same as those of the voyage mentioned in the policy, this shall be considered only as an *intention to deviate*. If, indeed, the ship has liberty in the policy to touch at a place where it is not intended she shall go, yet the policy will be good. If from a certain point in a voyage there be several tracks, of which the captain usually elects which he will pursue; but a particular track is *prescribed to him* by the insured: this should be mentioned in the policy, otherwise it would be void.

Fifthly. The various perils against which the insured means to be protected, must be distinctly enumerated in the policy. These are generally expressed in a form of words which have been long in use, and which afford full protection against every accident or misfortune that can possibly happen in the course of any voyage, and for which it is meant that the insurer shall be answerable. There are, however, certain losses which are not comprehended in the usual words of the policy: such are injuries occasioned to goods by bad stowage, by being exposed to wet, by theft, and embezzlement of the master or mariners, &c. In all our policies are inserted the words "lost, or not lost," by which the insurer takes upon himself, not only the risk of future loss, but also the loss, if any, that may already have happened.

The *sixth* requisite in a policy respects the powers of the insured in case of misfortune. It was formerly doubted whether the insured might use his endeavours to recover the goods which had been lost, or in preserving such as had been saved, without waving his right to abandon. In order to obviate this doubt, a clause was introduced into the policy to enable the insured, in case of any loss or misfortune, to employ all necessary means for the defence, safeguard, and recovery of the goods or ship insured, without prejudice to the insurance, and at the charge of the insurers, to which they bind themselves to contribute in proportion to their respective subscriptions.

Seventhly. The next clause in the policy is that by which the insurers bind themselves to the insured for the true performance of their contract, and confess themselves paid

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the consideration or premium, by the insured, after the rate specified. In practice the premium is not always paid when the policy is underwritten. Insurances are generally effected by the intervention of *brokers* (see that article), and open accounts are usually kept between them and the underwriters, in which they make themselves debtors for all premiums. It is laid down, by usage of trade, that the insurer is to look to the agent who is employed to effect the policy for his premium: but whether the insured himself or the agent is liable, the insurer may receive the premium, and "indebitatus assumpsit" will lie for it, notwithstanding the formal acknowledgment of the receipt of it in the policy, which is not inserted there as conclusive evidence of the actual payment of the premium, but to preclude the necessity of proving it in case of loss. However, the payment or non-payment of the premium can have no effect upon the insurance. The rate of the premium must always depend on the agreement of the parties; and therefore the premium, whatever it may be, is always reputed to be just and fair, if there be no fraud or surprise on either side. If the nature of the risk be fairly and fully declared by the insured, the insurer can never dispute the payment of a loss, on the ground of the smallness of the premium.

Eighthly. The common memorandum follows for confining the insurances to their only proper object, namely, an indemnity against real and important losses arising from the perils of the sea; and to obviate all subjects of litigation about trivial losses, and losses arising from the perishable quality of the goods insured. Accordingly this memorandum constantly stipulates, in all our policies, that in the case of certain enumerated articles, of a quality peculiarly perishable, the insurer shall not be answerable for any partial loss whatever; that, in the case of certain others, liable to partial injuries, but less difficult to be preserved at sea, he shall only be liable for partial losses above 5 *per cent.*: and that, as to all other goods, and also the ship and freight, he shall only be liable for partial losses above 3 *per cent.* But in this memorandum there is an exception of all losses, however small, of the nature of "general average," or when the ship is stranded: but this last exception is only found in the policies of private underwriters.

The *ninth* requisite is the date and subscription. The sum insured is generally placed after the signature, in the underwriter's hand-writing, and in words at length, not in figures, which are easily altered or changed. But it is not indispensably necessary that the sum should be specified in the policy. An insurer may bind himself to pay the value of the effects insured, or a given proportion of it, without fixing that value in the policy. A policy of insurance, like every other contract in writing, should have a date. This date seems, when compared with the dates of facts connected with the transaction, to discover whether there be reason to suspect any fraudulent concealment, at the time of any of the subscriptions to the policy. Each underwriter puts the date to his own subscription.

The *tenth* or last requisite of the policy is the stamp. The statute of 35 Geo. III. c. 63. imposes upon every 100*l.* insured, a duty of 2*s.* 6*d.*, and so progressively for every sum insured, and for a less sum than 100*l.*, the like stamp of 2*s.* 6*d.*; and for every fractional part above 100*l.* or any progressive sums of 100*l.* each, a like duty of 2*s.* 6*d.*; and where the premium *bonâ fide* paid, or contracted for, shall not exceed the rate of 10*s.*, and the sum insured amounts to 100*l.*, a duty of 1*s.* 3*d.*, and so progressively for every 100*l.* and the fractional part of every 100*l.* insured. Provided that where the premium shall not exceed 10*s.* *per*

cent., and the sum insured amounts to 200*l.* or upwards, a stamp of 2*s.* 6*d.* may be used for every 200*l.* insured, instead of stamps of 1*s.* 3*d.* for every 100*l.* Where the sum insured on homeward voyages exceeds the interest of the insured by 1000*l.* where the stamp is 1*s.* 3*d.* *per cent.*, or 500*l.* where it is 2*s.* 6*d.*, the excess of duty may be allowed. Every contract shall be deemed a policy, which shews the premium, risk, sum insured, and names of insurers. No policy of a ship is to be for a longer term than twelve months: nor shall any such insurance be available in law unless duly stamped, and no policy is to be stamped after the insurance shall be printed or written. Any person effecting such insurance, or paying any premium, or contracting for such insurance, unless it be printed or written, &c. duly stamped, shall forfeit 500*l.*: and brokers negotiating such insurances shall forfeit the same sum: nor shall any brokerage be charged, unless such insurance be printed or written, and duly stamped. Any person insuring without a stamp, or concerned in any fraud to evade the stamp duties, shall forfeit 500*l.* The two law-insurance companies, *viz.* the London Assurance and the Royal Exchange Assurance companies, may make agreements for insurances on unstamped labels, provided the policies be made out in three days after. Any alteration may be made in the policy, before notice of the end of the risk, if the premium exceed 10*s.* *per cent.* The act contains other regulations, which it is not necessary for us to recite. By the statute 41 Geo. III. c. 10. §. 1. all the duties imposed by the above act are doubled. (See STAMP.) The general form of the policy, which has been for many ages nearly the same, is never altered but with the utmost caution, and upon very great consideration; nor can it be altered except by the consent of all parties, or by the authority of a court of equity, or perhaps a court of law, and then only in a case where something has, by mistake or fraud, been inserted or omitted contrary to the manifest intention and the real agreement of the parties; and a case of this sort must be made out by unquestionable testimony to warrant such an alteration. When an underwriter agrees to alter the policy in order to correct a mistake, he shall not afterwards object that he ought to have had an increase of premium. Marshall's Treatise on the Law of Insurance, vol. i.

POLICY of Insurance, or Assurance of Houses, is an instrument formed on the model of that for vessels; by which a person, or community of persons, take on themselves the risks and damages that may befall houses, their furniture, in whole, or in part, &c. from fire, on consideration of a certain sum, or sums, to be paid by the assurer, according to the terms of the agreement.

The insurance from fire is now a popular species of commerce; and we have a number of societies erected into corporations for that purpose. See INSURANCE.

Policies against fire are subject to a stamp of 3*s.* if under 1000*l.*, and 6*s.* if 100*l.* or upwards; and also to a yearly duty of 2*s.* *per cent.* on the sum insured. 37 Geo. III. c. 90.

POLICY of Insurance of Lives, is an instrument by which a society of persons, erected into a corporation, &c. oblige themselves to pay a certain sum of money, or an equivalent annuity, upon the death of a person whose life they assure, in consideration of a certain premium, either in a gross sum, or by annual payments, to the person for whose benefit the insurance is made, whenever the death of the person insured shall happen, if the insurance be for the whole life, or in case this shall happen within a certain period, if the insurance be for a limited time.

The policy is under the seal of the office, and entitles the person in whose favour it is granted, to make good his claim, according to the tenor of the articles, or by-laws, of the society. See ASSURANCE on Lives, and STAMP.

POLICY, *Officers of.* See OFFICER.

POLICY, in *Letter Foundery*, is sometimes used for a rule that regulates the number of letters of each kind in a complete font; *i. e.* to determine how many, in proportion to the whole set, there are to be of each particular kind.

For instance, in a font of a hundred thousand characters, there are to be five thousand for *e*, a thousand for *a*, three thousand for *m*, thirty only for *k*, as many, or a little more, for *x*, *y*, and *z*; and in proportion for the other letters, the great and small capitals, the initial letters, points, commas, double letters, &c. See LETTER FOUNDERY.

POLIDE, formed of *πολις*, *city*, and denoting the patroness of a town or city, in *Mythology*, an epithet given to Minerva, under which title she had two temples; one at Erythres, in Achaia, and another at Tegea, in Arcadia.

POLIDORO, DA CARAVAGGIO, in *Biography*. See CALDARA.

POLIEA, *Πολιεια*, in *Antiquity*, a solemnity of Thebes in honour of Apollo, surnamed *Πολιος*, *i. e.* grey, because he was represented in this city (contrary to the practice of all other places) with grey hairs. Potter.

POLIEUS, formed of *πολις*, *city*, and denoting the protector of a city, in *Mythology*, a name under which Jupiter had a temple in the citadel of Athens.

POLIGNAC, MELCHIOR DE, cardinal, in *Biography*, a statesman and man of letters, born in 1661, was second son of the viscount de Polignac, a branch of one of the most illustrious families in that province. Being destined for the church, he was sent, at an early age, to Paris, and placed in the college of Clermont. He soon made himself acquainted with the systems of Aristotle and Descartes, and maintained the truth of both, with vast applause, in two theses, which he publicly defended in two successive days. He obtained equal reputation in his theological exercises. He was not formed less to shine as a man of the world than as a student, and was received in the politest circles in Paris. "Of all men I know," says Madame de Sevigné, "he appears to me one of the most agreeable. He knows every thing, he talks of every thing; he has all the softness, the vivacity, the complaisance, that can be desired in social intercourse." The cardinal de Bouillon took him to Rome in 1689, and employed him not only in the election of the new pope Alexander VIII., but in the accommodation of the differences which had arisen between the courts of France and Rome. On these occasions he displayed a talent for negotiation that equally obtained the applause of the pontiff, and of his own sovereign Lewis XIV. In 1693 he was appointed by the king ambassador to Poland, where the declining health of John Sobiesky rendered it necessary that measures should be taken for the support of the French interest in the approaching election to that crown. His want of success obliged Lewis to appear dissatisfied with his conduct, and he was ordered to his abbey, where he occupied himself with literature, and where he composed his "Anti-Lucretius." In the mean time he was not inattentive to the recovery of the royal favour, and upon the succession of the duke of Anjou to the crown of Spain, he wrote to Lewis in the following terms: "Sire, if your majesty's prosperity does not put an end to my misfortunes, at least it makes me forget them." Shortly after this courtly epistle he was recalled to court, where he was received very graciously, and appeared with more splendour than before. He was employed again in various important

political missions, and was at length, as a reward for his many services, elevated to the cardinalate, and was in the same year, 1713, made master of the chapel royal. After the death of Lewis XIV., the cardinal connected himself with the enemies of the regent, and was exiled, in 1718, to the abbey of Anchin, whence he was recalled in 1721. The monks of the abbey, who had been intimidated on his coming among them, were so captivated by his affability and generosity, that they wept at his departure. In 1724 he went to Rome, to assist in the election of Benedict XIII., and remained eight years in that city as minister of France. During this period he was nominated to the archbishopric of Auch, and made commander of the order of the Holy Ghost. He died at Paris in 1741, at the age of 80. As an author, he is chiefly known and remembered by the "Anti-Lucretius," which was first published in 1747. It has gone through many editions in the original Latin, and has been translated into the French and other modern languages. The original is distinguished for the purity and elegance of its diction, and the happy turn of its expressions. It is successful in confuting the absurdities of the Epicurean system, but it substitutes in their place the reveries of Descartes, in opposition to the true principles of Newton. Cardinal Polignac was possessed of a general taste for science, literature, and the fine arts: he was a member of the French Academy, that of Sciences, and that of Inscriptions and Belles Lettres. He had a large collection of antiquities dug up from the ruins of Rome: at one time he had formed a project of diverting the course of the Tyber, in order that strict search might be made for the relics contained in its bed. His private affairs fell into great disorder, and he died very much in debt. Moryer.

POLIGNAC, in *Geography*, a town of France, in the department of the Upper Loire; 6 miles N. of Puy.

POLIGNANO, a town of Naples, in the province of Bari, on the coast of the Adriatic, the see of a bishop, suffragan of Bari; 17 miles E. of Bari. N. lat. 41° 12'. E. long. 17° 14'.

POLIGNY, a town of France, and chief place of a district, in the department of the Jura; 9 miles N.N.E. of Lons le Sauniers. The place contains 5293, and the canton 14,678 inhabitants, on a territory of 252½ kilometres, in 30 communes. N. lat. 46° 50'. E. long. 5° 47'.

POLIIFOLIA, in *Botany*, a name given by Buxbaum, in the Petersburg Transactions for the year 1727, to the plant subsequently called by Linnæus *Andromeda polifolia*. See ANDROMEDA, and POLIUM.

POLINA, in *Geography*, a town of European Turkey, in Macedonia; 30 miles S.E. of Saloniki.

POLINARA, a town of Naples, in Calabria Citra; 11 miles N. of Bisignano.

POLING, in *Internal Navigation*, a term of the same import with setting, shoving, or pushing a boat along with poles, &c.

POLINIÈRE, PETER, in *Biography*, a French mathematician, who flourished in the 18th century, was born at Coulouce, near Vire, in Lower Normandy, in the year 1671. He was educated partly at Caen, and partly at Paris; at the latter he applied himself particularly to the study of mathematics. Here he published a work, entitled "Elements of the Mathematics," which, whatever might have been its merit then, has long since been superseded by other publications. In 1709 he published "Experiments in Natural Philosophy," which work met with so much success, that it was translated into several languages. He afterwards republished it 2 vols. 12mo. He was the first person appointed to deliver lectures on experimental philosophy

lofophy in the univerfity of Paris, and had the honour of delivering one courfe before the king. He retained the office of lecturer upwards of thirty years, and his labours were, at laft, terminated by a fudden death, in 1734, when he had attained the age of 63. He is characterifed as a man of clofe and indefatigable application, and affociated with fcarcely any perfons but men of fcience. He refided principally at Conlonce, and came annually to Paris, where he remained no longer than till he had gone through his courfe of lectures. Moreri.

POLIOPTRUM, in *Optics*. See POLYOPTRON.

POLIOPUS, in *Ornithology*, a name given by Aldrovand, and fome other authors, to the grinetta, a fmall bird of the moor-hen kind.

POLIPUT, in *Geography*, a town of Hindooftan, in the Carnatic; 5 miles S.E. of Bomrauzepollam.

POLISHER, an instrument, called alfo a burnifher, ufed for polishing and burnifhing gold, filver, and other metals, when gilt or filvered; and matters of other kinds, proper to take a polish.

The polifher is different in the different arts and manufactories. The gilders ufe an iron polifher, to prepare their metals before gilding; and the blood-ftone, to give them the bright polifh after gilding.

The polifher ufed by the makers of furs, bits, &c. is part iron, part fteel, and part wood. The inftrument confifts of an iron bar, with a wooden handle at one end, and a hook at the other, to faften it to another piece of wood held in the vice, while the operator is at work. In the middle of the bow, withinfide, is what they properly call the polifher; which is a triangular piece of fteel, with a tail, by which it is rivetted to the bow. What the cutlers call their polifhers are a kind of wooden wheels, for grinding, made of walnut-tree, an inch thick, and of a diameter at pleafure. They are turned by the great wheel; and it is on thefe they polifh and fmooth their works with emery and putty.

The polifhers ufed in the manufacture of glafs are very different from all thefe. They confift of two pieces of wood; the one flat, covered with old hat; the other long and half round, faftened on the former, whofe edge it exceeds, on both fides, by fome inches: which ferve the workman to take hold of, and to work it backwards and forwards by.

The polifhers ufed by fpectacle-makers are pieces of wood a foot long, feven or eight inches broad, and an inch and a half thick, covered with old caftor hat, on which they polifh the fhell and horn frames their fpectacle glaffes are to be fet in.

POLISHING, the art of giving a glafs or luftre to a thing; particularly a precious ftone, marble, glafs, a mirror, or the like.

For grinding and polishing fteel, the grindftones that are ufed are made to revolve, either vertically or horizontally, with a velocity fo great, as to defcribe fometimes as much as fixty feet in a fecond. The fteel is alfo, in fome cafes, drawn backwards and forwards horizontally on a circular furface; and in order that the action may be equally diftributed throughout the furface, it is allowed to revolve on an axis by means of the friction: its motion being confined to one direktion by the action of a catch. Various fubftances, chiefly of mineral origin, are alfo ufed, on account of their hardnefs, as intermediate materials, for grinding and polishing others. Thefe are diamond duft, corundum, emery, tripoli, putty, glafs, fand, flint, red oxyd of iron, or crocus martis, and prepared chalk. Thefe are fometimes applied in loofe powder, and fometimes fixed on wood, leather, or

paper. Cuttle-fifh bone and feal-fkin are furnifhed by the animal kingdom; and Dutch rufhes by the vegetable; thefe are employed chiefly in polishing wood or ivory. Marble is made fmooth by rubbing one piece on another, with the interpofition of fand; the polishing blocks are fometimes caufed to revolve by machinery in a trough, in which the marble is placed under water, and are drawn at the fame time gradually to and from the centre; or the flab itfelf, with the frame on which it refts, is drawn flowly backwards and forwards, while the blocks are working in it. (See *Polifhing of MARBLE*.) Granite is polished with iron rubbers, by means of fand, emery, and putty: but it is neceffary to take care, during the operation, that the water, which trickles down from the rubbers, and carries with it fome of the iron, may not collect below the columns, and ftain them; an inconvenience which may be wholly avoided by employing rubbers of glafs.

For the method of grinding and polishing optical lenfes, fee GRINDING, LENS, and MIRROR.

POLISHING of *Glaſſes, Lenfes, &c.* fucceeds the grinding of them.

The polishing of a mirror is the laft preparation given it with emery or putty.

For an account of the methods recommended by various authors for polishing glafs and metals in the conftruction of telefcopes, &c. fee GRINDING.

For the polishing of diamonds, &c. fee LAPIDARY; fee alfo DIAMOND, and GEMS.

When plates of glafs for looking-glaffes and mirrors are prepared in the manner ftated under *LOOKING-Glaſſes* and *MIRROR*, the next procefs is that of polishing both fufaces to that perfect brightnefs which is obfervable in finifhed mirrors, fo that the rays of light may pafs through unimpaird to the filvering on the pofterior furface, and be reflected again from thence, according to the laws of catoptries. The fubftance ufed to give this laft polifh is colcothar, imported from this country, and called "rouge d'Angleterre," or "Potée." It is the refidue left in the retorts of the aquafortis-makers, and when well washed and levigated confifts of little elfe than a red and perfect oxyd of iron. The polishing inftrument is a block of wood covered with feveral folds of black cloth with carded wool between each fold, fo as to make a firm elastic cuſhion. This block has a handle for the workman to hold; for the whole of this part is done by hand and not by machinery, as the latter would work too uniformly, and not allow of that variation of preffure and thofe finifhing touches which are required to bring every part of the glafs to exactly the fame height of polifh. But to increafe the preffure of the polifher, without fatiguing the workman, the handle is lengthened by a wooden fpring bent to a bow, and three or four feet long, which at the other extremity refts againft a fixed point in a beam placed above. The plate being fixed on the table by plaſter, he then moiftens the polifher with a wet brush, covers it with colcothar, and begins his operation by working it backwards and forwards over the furface of the plate. Much practical ſkill and dexterity is required to give an uniform and high degree of polifh over the furface of a large plate, as it muft be done by feparate portions, and the finifhing touches given with great care. The glaffes of moderate fize are completed in four portions from corner to corner, the centres of which intermingle fo as to leave no part untouched, but the larger glaffes require additional polishing in the centre. When one fide is completed, and the reverfe is about to be done, the polifhed fide, now the undermoft, is entirely covered with the red colcothar, to prevent the dazzle reflected from the white plaſter, which would

would prevent the workman from judging so accurately of the state of the surfaces on which he is employed. When both sides of the glass are thus brought to the same perfection of polish, the operation is finished by inspecting the glass, first cleaning both surfaces, and laying it, each side alternately upwards, upon a dark blue or black cloth, admitting only a moderate light, and if any part appear less highly finished than the rest it is retouched by a small hand-polisher and colcothar as before.

When a number of smaller pieces of glass, such as are used only for chamber or similar mirrors are to be polished, they are laid together on the table, and several of them polished at a time. But as these consist of pieces often of unequal thickness, though their surfaces have been rendered perfectly flat by the previous grinding, if they were simply placed side by side, and fixed on the table by plaster as usual, the polisher would not work well over such a variety of heights, and would act chiefly on the edges of each piece of plate. Therefore they are all first arranged on a large smooth plate, finished all but the polishing, and previously wetted, and plaster is poured upon them by which they are fixed together, and then when taken off, the surfaces which were in contact with the plate are perfectly level with each other, and the polishing goes on with the same ease as on an entire plate.

For an account of the next operation, which is that of *Silvering*, see that article, and *LOOKING-Glasses*.

POLISHING of Copper-Plates. See *COPPER Plates*.

POLISHING of Shells. See *SHELLS*.

POLISHING, Water. See *JAPANING*.

POLISMA, in *Ancient Geography*, a town of Asia Minor, in the Troade, upon the banks of the river Simoente. Strabo.

POLISTENE, in *Geography*, a town of Naples, in Calabria Ultra; 16 miles S.E. of Nicotera.

POLITI, ALEXANDER, in *Biography*, a learned Italian, was born at Florence in 1679. He was educated at the Jesuits' seminary, and became distinguished by his ardour in literary pursuits. At the age of fifteen he entered a college life, in order that he might complete his philosophical studies. He repaired to Rome for the study of theology, and on his return in 1700, was appointed professor of rhetoric at the same college in which he had studied, and afterwards of philosophy. In 1708 he published a compendium of the Peripatetic philosophy. After this he published a work entitled "De Patria in Testamentis condendis Potestate." His favourite study was Greek literature, and the author to which he devoted the labour of many years was Eustathius, the commentator on Homer. Having resolved to illustrate and translate his works into Latin, he began to execute his design in 1716, but it was not till 1730 that he was able to publish the first volume of his version of Eustathius's Commentary on the Iliad, which he dedicated to John Gaston, duke of Tuscany. The second volume he inscribed to pope Clement XII., and the third to Lewis XV. In consequence of this work he was appointed to the Greek professorship in the university of Pisa in 1733, and in a short time he was elected professor of eloquence. In the exercise of the duties of this office he was attended by a great confluence of auditors, who were attracted by the fame of his Latin orations on various occasions, many of which he published. Six of them were peculiarly calculated for popularity, being eulogies of the same number of towns in the Tuscan territory. In 1741 he published a Latin version of Eustathius's Commentary on Dionysius Periegetes, followed by two books of animadversions upon Dionysius and Eustathius. As his last work he undertook the laborious task of a new

edition of the Roman Martyrology, of which he published the first volume in 1751. In the following year he died, having completed his seventy-second year. Besides the writings above mentioned, he published "Epistola de Curibus Antiquorum," in the preface to the works of Meursius, printed at Florence: he was author likewise of other orations and treatises. His style is copious, fluent, warm, and enriched with a variety of erudition. Gen. Biog.

POLITIANO, ANGELO, an eminent man of letters, was born in 1454, at Monte Pulciano, in the Florentine territory, called in the Latin Mons Politianus, whence he derived the appellation by which he is usually known. He was sent for education at an early age to Florence, where he obtained the patronage of the family of Medici, particularly of Lorenzo, who admitted him as an inmate of his palace. He had the advantage of able instructors, and his progress was extremely rapid, especially in classical literature and poetry. His Latin epigrams, written when he was only thirteen years old, and his Greek at seventeen, caused him to be looked upon as the wonder of the school; and his Italian *stanze* on the tournament of Giuliano de Medici, one of the best pieces of vernacular poetry of that age, procured him general fame, and the particular regard of that illustrious house. He soon began to distinguish himself as a critic and original writer, and was at the age of twenty-nine made professor of Greek and Latin eloquence. In this situation he formed many scholars, who became eminent in literature: his lectures were not only well attended by the natives, but his celebrity attracted foreigners from all parts to Florence. Various honours and emoluments were conferred upon him; he entered into holy orders, and took his degrees in canon law. After this he was one of the ambassadors sent by the Florentines to do homage to pope Innocent VIII. at his election in 1485, and he was at this time in habits of correspondence with several crowned heads, and men of high rank, as well as with the principal literary characters of the age. Above all, as being to him of the most importance, he was honoured with the perpetual friendship and patronage of Lorenzo de Medici, who entrusted him with the education of his children, and the care of his library and museum, and assigned to him a constant residence in his own house. Politiano was unquestionably one of the most learned men of that age. He wrote elegantly in the Italian, Latin, and Greek, and was also versed in the Hebrew. He composed with equal facility and purity in prose and verse, and in the dignified and familiar style. He was an industrious and skilful collector of ancient MSS., and gave important assistance to the visitors in the early period of typography. In Italian poetry he may claim the rank of an inventor; for his "Orfeo," a dramatic composition represented at Mantua, and written in two days at the desire of cardinal Francesco Gonzaga, was the earliest example of that combination of music and lyric poetry with tragic action, which has since become famous under the name of the Italian opera. Politiano with all his literary excellencies was the slave of immoralities that have disgraced his memory: he was openly accused of infamous propensities, and of the total want of religion. Both these accusations were greatly exaggerated, in consequence of his own intractable and arrogant disposition, which involved him in perpetual quarrels. He, however, retained the kindness of his illustrious patron so long as the latter lived, and at his house at Fiesole, he composed his elegant and rural poem entitled *Rusticus*. Politiano did not long survive his patron, dying at the early age of 40. He is said to have died like a good Christian, of which the chief proof is, that he requested to be buried in the habit of a monk. The works of Politiano are translations of various Greek

Greek authors, Greek epigrams, Latin epistles, poems, and philosophical treatises; a history of the conspiracy of the Pazzi in Latin; Italian poems; and a volume of Miscellanies, containing explanations and corrections of a great number of passages in the Latin classics, displaying very profound erudition. Roscoe's Life of Lorenzo de Medici.

The "Orfeo," of Politiano, a poem for music, was certainly the first attempt at a musical drama in Italy, which was afterwards perfected by Apostolo Zeno, and Metastasio. We shall, therefore, present our readers with an account of it, as lately published in the seventeenth volume of the "Parnaso Italiano," where it is said to be a beautiful piece of poetry, written by the elegant pen of Politiano in the dawn of dramatic representation.

To this drama there is an argument in verse. The piece is in five acts, and founded on the ancient fable. Aristæus, a shepherd, the son of Apollo, loved Eurydice, the wife of Orpheus, in so violent a manner that he pursued her in the fields, and in her flight from him she was stung by a serpent, of which she died. Orpheus by singing so softened the infernals, that they suffered her to depart, on condition that he would not look behind him. But not obeying this injunction, she was forced back to hell. Upon his grief, and resolution never to love another female, the Thracian women tore him to pieces.

Atto primo, Pastorale.

Part of the first scene seems to have been declaimed; though it is in verse, in *terza rime*; but the rest is called canto di Aristeo.

"Udite, felle, mie dolce parole,
Poichè la bella ninfa udir non vuole."

These two lines are the burden of his song, which is beautifully pastoral.

Atto secondo, Ninfale.

Aristæus, a dryad, and chorus of dryads.

This is beautiful poetry, consisting of complaints for the death of Eurydice.

Atto terzo, Eroico.

Orpheus comes in singing the following Latin verses, accompanying himself on his lyre.

Orpheus. "Musa, triumphales titulos, et gesta canamus.
Herculis, et forte monstra subacta manu.
Et timidæ matri pressos ostenderit angues
Intrepidusque fero riferit ore puer."

Then the dryad tells the sorrowful tale of Eurydice's death. This act seems all to have been sung. A satyr follows the afflicted Orpheus to see whether the mountains are moved by his song.

Atto quarto, Nigromantico.

Orpheus visits the infernal regions; himself, Pluto, Proserpine, Eurydice, and Tefiphon, are the interlocutors.

"E' vien per impetrar mercede o morte
Dunque m' aprite le ferrate porte."

The whole of this act is admirable, and all the interlocutors speak in character.

Atto quinto, Bacchanale.

Orpheus, one of the Menades (not Thracian women), and chorus of Menades, who tear him to pieces.

The whole of this drama, which, from its brevity, seems

chiefly to have been sung, is admirably calculated for impassioned music of every kind.

First act, one hundred and twelve lines; second, eighty-two; third, forty-four; fourth, one hundred and seventeen; fifth, seventy-eight; in all four hundred and thirty-four verses.

Politiano was always passionately fond of music, and is said to have died playing on the lute.

POLITICAL, πολιτικός, formed from πολις, *city*, something that relates to policy, or civil government.

In this sense we say, political interests, political views, political discourses, &c.

POLITICAL Arithmetic is the application of arithmetical calculations to political uses and subjects, as to the revenues, number of people, extent and value of land, taxes, trade, &c. in any nation. These calculations are generally made with a view to ascertain the comparative strength, prosperity, &c. of any two or more nations: that is, of their wealth. Political arithmetic does not determine in what national wealth consists, but estimates the value of whatever passes by that name, and distinguishes the proportions by which the component articles may be applied to purposes conducive to the safety or prosperity of the community. It will be readily allowed, that in the application of arithmetic to the subjects of **POLITICAL Economy**, (which see,) it loses much of its precision from the fluctuating nature of all kinds of property, both with respect to distribution and value, the state of which it is one of its chief objects to estimate; it retains, however, a sufficient degree of certainty to become an interesting object to every person who wishes to acquire a just idea of the resources either of the community to which he belongs, or of other nations.

On this subject, if the particulars assumed as facts could be obtained correct, the deductions obtained from them would be nearly as determinate and invariable as in any other branch of arithmetic; but as the former cannot be perfectly depended upon, the latter will necessarily be only approximations to the truth. Such approximations, however, may be sufficient for most purposes of practical utility.

Political arithmetic has been much cultivated, of late years, in many parts of Europe, particularly in our own country, in France, and Germany; but as its application, however varied in different places, is very similar, it will be our business in the following article, and in that under the word **POPULATION**, to endeavour to illustrate the subject, by attempting to determine the state of the national wealth of Great Britain at or about the commencement of the present century.

POLITICAL Economy is the science in which the wealth of nations is considered. Its object is to ascertain, in the first place, in what wealth consists, and then to explain the causes of its production, its increase and diminution, and the principles on which it is distributed through the different orders of society. It likewise endeavours to point out the tendency which any political regulations may have to favour or injure the productions, or most advantageous distributions of wealth.

The writers on political economy have been arranged in two great classes, the former composed of those who regard commerce, and the latter of those who regard agriculture as the principal source of national wealth. Almost all the old writers belong to the former class. Of our own countrymen, the most considerable are Dr. DAVENANT, and sir JOHN STEWART, (see their articles,) and their principles are interwoven in Anderson's "History of Commerce." The commercial system of political economy is very ably examined, explained, and illustrated in the "Wealth of Nations," by

by our countryman Dr. Adam Smith. The agricultural system is of comparatively recent origin. It was first brought into notice by M. Quesnai, a celebrated French physician, and his ideas have been adopted and diffused by several very able writers, particularly in a work, by Mercier de la Rivière, entitled "L'Ordre Naturel de Sociétés Politiques." The writings of Quesnai have been published, commented upon, and illustrated, in a work entitled "Physiocratie," by Dupont de Nemours. The followers of Quesnai, who are commonly great enthusiasts in behalf of the system of their leader, are known, throughout Europe, under the denomination of "Economists." The most important work, by much, on political economy, is the treatise on the "Wealth of Nations," to which we have already referred, and shall have recourse, in this article, again and again. Some errors may have been discovered in the arguments, but they are trifling in comparison of the great excellence of the treatise as a whole, so that it still deserves the praise that has frequently been bestowed upon it, as a work at once original, accurate, and profound, as just in its general principles, and perspicuous in its illustrations.

A striking and very important difference between the systems of political economy, as detailed a century ago, and that introduced by Adam Smith, consists in this, that the former are calling, upon all occasions, for the regulation and controul of laws; regarding the legislature as best qualified to estimate the value of any particular branches of trade, or modes of conducting business; while by the latter the merchant is supposed to be the best judge of the most eligible method of conducting his own affairs. The former has been rightly denominated a system of restrictions and encouragements, in which little is left to the choice and sagacity of individuals: in the latter it is supposed that national wealth, which is the aggregate of individual wealth, will increase most rapidly, where, while private property is rendered sacred by the laws, talent and enterprise are under the least possible restraint. Having spoken thus generally on the subject, we shall advance to particular details, beginning with an enquiry into

The Nature and Effects of Wealth.—Whatever be the nature of wealth, notwithstanding what has been said of it by moralists and divines, it cannot be denied that it is the object of the ambition of individuals and nations, the cause of their quarrels and contentions, and not unfrequently the reward of violence, of fraud, and injustice.

Some writers, as sir William Petty, state the wealth of a nation to consist in the totality of the private property of its individuals; others in the abundance of its commodities. Some, distinguishing *public* from *private* wealth, assign to the former a value in use, but no value in exchange; and to the latter an exchangeable value, but no value in use; and these make public wealth to consist in the exchangeable value of the net produce. Others say that wealth consists of all the material commodities which man may use to supply a want, or to procure an enjoyment either to his sensuality, his fancy, or his vanity. One defines wealth to be whatever is superfluous. M. Canard, a modern French writer, in his "Principes d'Economie Politique," calls wealth the accumulation of superfluous labour; and the earl of Lauderdale, who, like the French economists, distinguishes individual riches from public wealth, submits "that the latter may be defined to consist of all that man desires as useful or delightful to him, and the former to consist of all that man desires as useful or delightful to him, which exists in a degree of scarcity." This definition has been ably controverted in the Edinburgh Review, vol. iv. The common apprehensions, wealth, in the simplest and most general acceptance of the term, consists in the surplus of

produce above consumption, or of income above expenditure. The extent both of public and private wealth depends, it should seem, on the accumulation of this surplus, and on the manner in which it is managed and applied. When individuals and nations have not enough to supply their wants, they are poor; when their means are adequate to all their wants, they are equally removed from poverty and wealth: and when they have a surplus left, after supplying all their wants, this surplus constitutes wealth.

The passion for wealth is universal, and the history of man and civil society shews that it is always active and enterprising. It is the spring of almost all our actions. The passion for wealth is not peculiar to mankind exclusively, vestiges of it are found among some species of the brute creation, but there is this difference between them. "In the brute creation, the propensity is limited; in men, it seems to be without bounds. It has not influenced animals to advance one step beyond the instinct that directs them for means to self-preservation, while, in men, it has been the principle and promoter of intellectual faculties, of liberal and mechanical talents, of ingenious and active industry: it has afforded mankind ample means and vast resources; secured them against want, procured them conveniences, comforts and enjoyments the most exquisite; and extended, as it were, the dominion which nature destined for man, so that the distance which separates mankind from the animal creation might be measured by the distance of the most refined enjoyments from the ordinary wants, or, in other words, by the distance of wealth from poverty."

This passion for wealth, which nature designed for the most useful and beneficial purposes, has long been a constant source of disorder, violence and calamities, among individuals and nations. Ancient history, and the records of the middle ages, continually exhibit the passion for wealth, as an obstacle to the safety, the liberty, and happiness of individuals: to the independence and prosperity of nations, and to the increase and welfare of mankind: it was ever arming men against men, cities against cities, and people against people. We cannot stop to adduce facts in proof of these assertions: to those conversant in history there is no need of amplifying: they already know what course the passion for wealth formerly followed, and the share which it had in the elevation and decline of the states to which we have referred.

Modern nations are not less addicted to the passion for wealth, than the nations of antiquity, and of the middle ages; but they have been more enlightened or more fortunate in the direction which they have given to that passion; and wealth, it has been assumed, has been as productive of public and private prosperity, as it had been before of general and individual distress. Produced by labour, it rendered men attentive to the means of augmenting the productiveness of labour. They soon perceived that the free labourer who works for profit, multiplies the produce he consumes during labour; while the slave or bondman scarcely replaces what he consumes. Wealth, produced by labour, maintains nine-tenths of the people, the strength, energy, and dexterity, with which man is endowed by nature; and it develops in the remaining tenth, those faculties of the mind which seem beyond the sphere of humanity, and which bring man, as it were, nearer to the divine nature. Produced by labour, wealth banishes idleness, and the vices unavoidably connected with idleness; it renders man laborious, patient, economical, and at the same time adorns him with those precious qualities, the sources of individual, domestic, and social virtues. It binds the natives of the same land by the most powerful ties, mutual wants, and reciprocal

cal services. It has rendered nations more powerful, because every individual member is interested in the success of national affairs; all bear their weight, and all share in the advantages which they procure. This community of good and evil, to which the circulation of wealth calls every individual of the nation, affords the greatest strength which the social compact possibly can or ever did produce. This stimulus is active among industrious and commercial nations, and its strength and intensity can never be impaired or lost. Whatever may be the stock of riches accumulated through labour, it impoverishes no one; on the contrary, it enriches every individual: it is the instrument of general wealth; it increases the mass of labour, and the sum of its produce; and, consequently, augments the resources of the laborious, and the treasures of the rich. The effects of wealth produced by labour are felt alike by the nations that compose the great family of mankind, and by the individuals who compose each national family. In this system, it is the interest of all to labour, the one for the other, and to increase the stock of general wealth. The labour, industry, and commerce of every individual is useful to all, whatever portion of the globe they may inhabit. The more extensive agriculture of one country is beneficial to all laborious, manufacturing, and trading nations; it increases the produce destined for general consumption, which, in its turn, augments population; and this augmented population affords new consumers of the productions of the industry of every nation. Thus all nations share in the prosperity of each, and the portion of each is proportioned to its labours, manufactures, and commerce.

Of the various Systems concerning the Sources of Wealth.—The most ancient system concerning the sources of wealth, derives wealth from foreign commerce; that is, from that commerce in which one nation sells more to other nations than it purchases, and is paid for the surplus of its sales over its purchases in precious metals. This doctrine was adopted, without any limitation, by the authors who first wrote upon political economy in England, Italy, and France, and up to the middle of the eighteenth century; and it still prevails in the opinions of most individuals, nations, and governments; almost all consider commerce as the true way to grow rich, and by commerce they understand the exchange of commodities with foreign nations. In proof of which, it is said, with reference to Phœnicia, Alexandria, Carthage, Rome, &c., that if we ascend ever so high in the history of wealth, we find that wealth always followed the direction of foreign commerce, and remained faithful to its banners and ships. The question is, How does commerce enrich a country? By what channels does it pour its benefits? And how is the productiveness of commerce to be increased, and its prosperity insured? Most writers supposed that foreign commerce enriches a country by the plenty of gold and silver which it causes to circulate, and hence governments endeavoured to retain the precious metals, or to invite them by encouraging national manufactures, by directly or indirectly prohibiting the produce of foreign industry, or by procuring to the produce of national industry an easy and even privileged introduction into foreign countries. Such is the system which places the source of wealth in foreign commerce, and which, on that account, has been called the mercantile system. Davenant, though a partisan of the mercantile system, did not, like many of its advocates, limit its advantages to the abundance of precious metals which it accumulates in a country; he lays it down as a principle, that every trade is advantageous, provided its returns be more considerable than its exports, even though the returns should consist in perishable commodities.

The mercantile system was general, till some discussions took place on the forced lowering of interest, and an excessive paper circulation led to the inference, that gold and silver, which till then had been considered as true wealth, are only the instruments of its circulation; and this view of the subject, almost as soon as it was started, gave birth to fresh enquiries into the nature of wealth. It was now that M. Quesnai acquired great celebrity by the new views of his "Theory of the Sources of Wealth." He does not place the source of wealth in commerce, because all its operations are limited to the conveyance of the produce of the soil and industry from one place to another. Neither can industry aspire to this eminent prerogative; because it only transforms the territorial produce into different shapes, without adding any thing to its quantity; and because its productions are only the material representatives of the produce of the soil, which the manufacturer has employed or consumed. Land alone, according to this system, is the true source of wealth, because it produces every thing that man desires for the supply of his wants, for his enjoyments, his pleasures and his fancies; and because it constantly reproduces a quantity superior to what has been consumed to effect its reproduction. This excess of reproduction, this gratuitous gift of the soil, this net produce, is the only fund that can be employed to encourage the progress of labour, to reward its success, to promote improvements, and indefinitely to increase the sum of public and private wealth.

Agricultural labour, by a necessary consequence, is the only productive one; all other labours are barren and unproductive. By another consequence not less just, the surplus of the produce of the soil above all expences to obtain it, being a gratuitous gift of the land, ought to belong to the land-owners; they alone can distribute it to the other classes of the community, a circumstance that gives them the character of paymasters, and to those who receive it the character of mercenaries. On this respective paying and being paid, the economists built the relative rights of governors and governed. They asserted, that the land-owners, as paying, ought alone to share in the government; and that all those who are paid, cannot take any part in it without an evident and manifest usurpation; and finally, M. Quesnai maintained, that the net produce being the sole disposable wealth, the public revenue can only be derived from part of this produce; that the act of sharing in the net produce renders government a co-proprietor of the soil; and that this co-proprietorship constitutes its rights to government, which right is limited by its co-proprietors.

At this period, the principal writers on political economy, and who defended the mercantile system, were Genovesi, Beccaria, Carli, and Verri, all Italians, who made wealth depend on the unlimited liberty of foreign commerce, and triumphantly refuted the system of the French economists. At this time the Italians very much surpassed the writers of the rest of Europe in the science of which we are treating, and they kept this superiority till Adam Smith enquired into the nature and causes of the wealth of nations, and combating the mercantile and agricultural system with weapons equally formidable, assumed other principles, and was, as it were, the creator of the science.

Notwithstanding the high rank which Dr. Smith holds, lord Lauderdale has asserted, that he had no fixed opinion as to the sources of national wealth, and quotes some passages from his celebrated work in defence of this assertion. In one place Adam Smith says, "that the annual labour of every nation is the fund which originally supplies it with all the necessaries and conveniences of life, which it annually consumes, and which consist always either in the immediate

produce of that labour, or in what is purchased with that produce from other nations." In another place, he says, "lands, mines, and fisheries, replace with profit not only the capitals employed on them, but all other capitals employed in the community;" in a different part of his work, it is stated, "that the real wealth of a country consists in the annual produce of its land and labour;" then, "that the land and capital stock are the two original sources of all revenue, both private and public; capital stock pays the wages of productive labour, whether employed in agriculture, manufactures, or commerce;" and lastly, he asserts, that we ought to consider "land, labour, and capital, as being all three sources of wealth; for whoever derives his revenue from a fund that is his own, must draw it either from his labour, his stock, or his land." These passages are, no doubt, difficult to reconcile; nevertheless, upon an attentive review of the whole work, it seems certain, that he placed the source of wealth in labour, which fixes and realises itself in some particular subject, that lasts for some time, at least, after that labour is past, whose power is augmented by sub-division, which is developed by trade, improved by competition, and proportioned to the extent of the market, capital, and wages.

Ever since Dr. Smith published his great work, no other theory has been proposed, and though he may not have assigned the limits of the science, nevertheless he has so well determined its principles, that it will be impossible to miss or go astray from the doctrine which he means to establish. Lord Lauderdale, who has criticised some fundamental points of Dr. Smith's, derives wealth from land, labour, and capital; and he goes farther, he attempts to determine the share of each of these sources in the formation of public wealth.

Such are the various systems concerning the sources of wealth. Though they appear at variance, their difference is little more than nominal, and of very little importance to the science. The partisans of the mercantile system do not assert, that the precious metals which are accumulated by commerce, in a country, are not derived from the produce of land, labour, and capital; they even take it for granted that it is so. Again, the French economists do not pretend to believe, that the soil spontaneously yields wealth, so far from it, that they allow, if land be the source of wealth, it is agriculture that multiplies it; and by agriculture they understand the labour and capital of the husbandman; they even admit that the exchangeable value of the agricultural produce is the measure of wealth of a nation; and that this exchangeable value can only be obtained by the free concurrence of the home and foreign trade; in this way the economists themselves derive wealth from land, labour, capital, and commerce. By placing the source of wealth in labour, which fixes and realises itself in some permanent object, Dr. Smith likewise admits the co-operation of land, labour, capital, and commerce. Finally, the system of the earl of Lauderdale differs from the other systems only as far as his lordship assigns a particular importance to capital. In every other respect the noble lord coincides more or less with the agricultural system, and the system of labour.

Thus, it is evident, that it is not properly concerning the sources of wealth that the different systems vary; they all, in fact, acknowledge that wealth is produced by the concurrence of labour, land, capital, and commerce; they chiefly differ respecting the more or less important share which they assign to each of these causes; in this consists their difference, and in this lies all the difficulty of the science. The problem to be resolved is this: of the three

causes, labour, capital, and commerce, which is best calculated to produce public and private wealth?

Of the various Systems concerning Labour, as a Source of Wealth.—In every system of political economy, labour has the greatest share in the formation, increase, and preservation of wealth. If the labourer find the precious seeds of wealth in the spontaneous gifts of the soil, he fertilises, multiplies, varies them by his activity, his skill, and his industry; and obtains results so new, so different, and so remote from their nature, that he may almost be regarded as the creator, rather than as the co-operator in obtaining wealth, and hence Canard defines wealth to be "an accumulation of superfluous labour."

On this subject many interesting questions occur: Is this productiveness of wealth exclusively reserved to one, peculiar to a few, or common to all sorts of labour? Is there, among the different kinds of labour, any one more especially productive, and favourable to the progress of wealth? Is agriculture more conducive to wealth than manufactures and commerce? What are the means of rendering these different labours more productive and more profitable? Which are the obstacles that oppose their progress and impede their success? These questions it will be interesting to investigate and appreciate, as far as the nature of our work will allow.

The economists assign, exclusively, to agricultural labour the power of producing wealth, and regard every other kind as barren and unproductive. They do not deny the usefulness of what they call unproductive labour,—they only limit its utility; and assert, that with regard to manufactures, this utility consists in the adaptation of the agricultural produce to consumption; with regard to commerce, in its conveyance to the consumer; and with regard to sciences, literature, and the arts, in their power of defending, protecting, and encouraging all kinds of labours, in multiplying the enjoyments of life, and in extending and improving the moral and intellectual faculties of man; services which, notwithstanding their importance, only modify, or transport the agricultural produce, add nothing to its quantity, and yield no new produce; whence they infer, that agricultural labour is the only productive one. This system was not adopted by any English or Italian writer of celebrity; of late years it has met with an able defender in Garnier, a French senator, who translated the *Wealth of Nations* into his own language, for the purpose of writing notes and comments, which he trusted would render the system of the economists triumphant over the doctrines of Smith, and all the writers who have opposed his favourite opinion. In our country, at a still later period, the economists have found a most ingenious advocate, in Mr. William Spence, at least to their main principle, that the soil is the grand source of wealth. See his tracts, entitled "*Britain Independent of Commerce;*" and "*Agriculture the Source of Wealth to Britain.*"

In the present state of civilization, we know labour only through the exchange of its produce; in this exchange, every labourer, every family, every nation, find means of supplying their wants, procuring some comforts, and reaching a more or less elevated point of prosperity, power, and happiness. Hence labour appears to contribute to wealth, merely through its produce being exchanged, and by this exchange alone, its particular and general properties ought to be estimated. But the French economists consider it very differently; they divide it at once into productive and unproductive. The value of labour cannot be separated from the exchange of its produce; for if the produce of labour be not exchanged, every individual would be reduced to work to procure the articles necessary for his food, his raiment,

ment, and his dwelling; and under such circumstances, ages must roll away, before the unexchanged labour of individuals would produce any wealth. Agricultural labour, then, cannot alone be productive of wealth; and if, like all other kinds of labour, it co-operate in the creation of wealth, merely by the exchange of its productions; if it has no value, but through this exchange, it cannot be called the only productive labour, in opposition to all other kinds.

Of agricultural produce, one part is destined to replace that which has been consumed by the husbandman during his labour; this part has no value of its own, it is merely the instrument of agriculture destined to supply absolute and indispensable wants, and cannot contribute to the formation of wealth. The other, called the net produce, has no value as long as it remains in the hands of the husbandman. His stock, as stock, is no wealth to him; it is only when this net produce departs from him to be consumed by others, that it becomes useful, obtains a value, and forms one of the elements of wealth. There are only two ways by which this net produce can be transmitted to others, *viz.* by a free gift, or by a cession against an equivalent. "The former," says a good writer, "cannot be practised for any length of time, and has not yet contributed to the wealth of any nation. Hospitality among those who are on the lowest steps in the scale of civilization, benevolence among those who are more civilized, and charity among those whose civilization is heightened by religion, have never been of great assistance to augment the population, wealth, or power of any nation." The second way, the cession of the net produce against an equivalent, alone confers a value upon agricultural labour; but in this case its value is relative, and, like the value of all other labour, is dependent on its being exchanged.

Dr. Smith, who refuted the position of the exclusive productiveness of agricultural labour, in a great measure, without, probably, being aware of it, by accusing of unproductiveness any labour which, after it is over, does not fix and realise itself in some permanent object; by denying the productive faculty to any labour which does not terminate in a material and permanent produce, and by supposing that wealth depends on the numerical proportion between the individuals employed in what he calls useful labour, and those who are not usefully employed, in fact, supported the principle which he had overthrown. On this account he wished to reduce the number of labourers who are not usefully occupied, and to increase that of those who are usefully employed, not reflecting that could this be accomplished, the formation of wealth would be impossible, because consumers would be wanting for the commodities produced, and then in future that which was not likely to be consumed would not be produced. Hence labours exclusively devoted to luxury, pomp, and even the most frivolous expences, are productive; because they co-operate to increase the population and wealth, and contribute to the splendour and power of states. Care must, however, be taken not to stretch this principle beyond its true limits; but so long as productive labours pay freely and spontaneously for what may be called frivolous labours, there is no fear of their extending beyond the boundaries which private and public wealth require; and it is on this account, that every kind of labour is productive, and contributes more or less efficaciously to the increase of public wealth, because it necessarily occasions the productions with which it is paid.

The question now occurs, as to the kind of labour, if any, which is most productive, and most favourable to the growth of wealth. This enquiry is of great importance; it is the

foundation of the science, since labour has the greatest share in the formation, increase, and preservation of wealth. "It is remarkable," says M. Ganilk, "that almost every writer on this controversy has regarded the labour, which is preferred in his own country, as the most productive. Thus, with the exception of Adam Smith, the English writers assign the first rank to commerce and manufactures. Dr. Smith not only placed agriculture above commerce and manufactures, but he attempted to assign different degrees of productiveness to different labours, and in his scale arranged agriculture at a very great distance above all other labours. In France, where agriculture has always predominated, the writers on political economy have generally granted agriculture the precedency before commerce and manufactures. In Italy, opinions have been divided, and according as they inhabited either the interior or the maritime provinces, the writers on subjects connected with political economy have extolled agriculture, or manufactures and commerce. It may, in this state of things, be worth while attempting to determine whether agriculture, or commerce and manufactures, are most conducive to the advancement of public and private wealth, to the welfare of individuals, the prosperity of nations, and their absolute and relative power; that is, to determine which of these labours obtains the greatest value for its produce on its being exchanged, which circumstance is, at once, the promoter, regulator, and arbitrator of wealth.

By means of agriculture, men may succeed in procuring corn and cattle for their food, and raw materials for their clothes and habitations, but here the progress of wealth stops: they would not think of producing any surplus, or of accumulating any stock. Or supposing that a surplus had been stored up, they would have no inducement to cede this to others, to whom idleness or accidents should have rendered it necessary, because no equivalent could be obtained, all agricultural productions being uniform and identical in the same country. But suppose the combined progress of agriculture and population should lead to the division of labour, and the separation of the labouring classes, what, under such circumstances, would be the growth of public and private wealth? As agricultural productions afford the means of subsistence, the wages of all labour, they would be distributed in proportion to the wants of the husbandmen, and the progress of agriculture; consequently, the share of the industrious classes would be small, and would not allow them to extend, to prosper, or to aspire to a free and independent condition. Supposing even that agriculture could by itself, as it has been asserted with regard to Egypt, China, and North America, raise a numerous, rich, and flourishing population, it would not be productive of any great moral and political virtues, of the energy, public spirit, and eminent qualities, which alone form really great nations, and render their inhabitants illustrious. Neither could a mere agricultural nation possess any means of resistance against foreign invaders, of power, and grandeur; hence we see the deficiency of the agricultural system with regard to political independence, national power, and public wealth. These defects equally shew themselves in the small extent of general labour, in the insulated condition of individuals, in the weakness of government, and in national impotency and general indifference; of course agriculture cannot be considered as the most productive of all labours, much less as forming "the natural constitution of a government the best adapted to the human race."

Do manufactures and commerce afford the advantage which seem to be denied to agriculture? If it be said that men begin by tilling their lands before they build ships

to go in search of new lands beyond seas; it may be answered, that those who are forced to devote themselves to maritime commerce, soon acquire that industry, the offspring of want, which does not stimulate other nations. This industry acquires great superiority, when labour is subdivided, when the manufacturing and trading classes, breaking the fetters which kept them enchained to agricultural classes, labour without waiting for the demand, submit their productions to commercial exchanges, and derive from the equivalents obtained in return, their subsistence, their comforts, and their wealth. Their economical notions then take a new course, their relations become complicated; the results of their commerce are lost in an obscurity so profound, that they are not always clear to the most acute and best exercised understandings, and their advantages and inconveniences are frequently mistaken.

As soon as the labouring classes, whether agricultural, or manufacturing and commercial, carry to market the surplus of their produce above their consumption, and exchange one for the other, general industry receives a fresh impulse, follows another direction, and attains a higher destiny. The producer does not wait for the produce being consumed before he reproduces more; neither does he limit his productions to the local consumption, or to his present and actual wants. In this system, every producer is a consumer; all productions are thrown into the scales of a general exchange, and commerce begets general production by general consumption. The labour of the husbandman is no longer confined to his necessary subsistence: he labours for a surplus, to be enabled to purchase objects, the sight of which, in the market, may inspire him with the desire of possessing them. The industrious do not now wait for orders to labour; they create, invent, perfect the means of rendering life convenient, comfortable, and agreeable; of multiplying enjoyments and satisfying every desire. They are no longer reduced to a mercenary hawking, but collect and preserve in their warehouses the surplus of productions which have not met with any demand, and endeavour to provide consumers for it on every point of the globe. In this way the trading classes produce, preserve, and multiply wealth.

Riches do not now consist in the proportion of produce to wants, of income to expenditure, of production to consumption; but in the accumulation of a surplus stored up for unforeseen wants and enjoyments. This surplus is a resource for the existing population against the uncertainty of the seasons, and it acts as a premium for their increase. Individuals are multiplied in proportion to the surplus that is accumulated, and nations prosper in the compound ratio of the mass of their surplus and the increase of their population, and public wealth results from the exchange of the surplus produce of general labour.

If property, the accumulated surplus of labour, be the spring of labour and wealth, the foundation of social order, and the support of public and private prosperity; how much must its power have been augmented by the abundance of gold and silver, which caused property to reach even the poorest classes of the community, which might be kept or transmitted, stored up or used at the call of their passions and dispositions, and according to the circumstances in which they were placed. By diffusing the advantages of property among the labouring classes, the precious metals served as a sort of bond of union, ranking them with the other classes, under the general name of proprietors. Thus greater degrees of civilization were obtained, and the people, otherwise but a few degrees above barbarism, became inspired with sentiments of justice and mutual benevolence. Now the effects which we have described as necessarily resulting from

the plenty of precious metals, considered merely as merchandize, belong exclusively to manufactures and commerce, and could not have taken place in the agricultural system, which shews at what a distance those two kinds of pursuits are from each other, and how greatly their reciprocal influence on labour and wealth differs. "How confined," says M. Ganilk, "the action of agriculture, which has nothing but wages to offer to manufactures and commerce, and builds upon the portion of its produce destined for such wages all its hopes of wealth. How extensive, on the contrary, the action of manufactures and commerce, which puts all the powers of labour into motion, multiplies its produce by exchanges, and redoubles their efforts in proportion to their success. In the agricultural system, labour is paid for by the idle land-owner, who fancies himself the richer for having less to pay: in the mercantile system, labour rewards labour; and even the idleness of the wealthy it never receives without giving, nor gives without receiving. The universal exchange of the produce of labour enables nations, reciprocally, to encourage each other to fresh labour by the hopes of new enjoyments; immense deserts, which nature had doomed to everlasting sterility, are peopled, cultivated, and fertilized."

This superiority of manufactures and commerce over agriculture, is proved by the history of wealth among all ancient and modern nations. Tyre, Sidon, Corinth, Athens, Syracuse, and Carthage, in ancient times acquired, by their industry and commerce, riches of which there is no example in any agricultural nation; and their wealth raised them to a degree of power and consideration to which their territory and population would not have allowed them to aspire. In the middle age, Constantinople, by her industry and commerce, preserved the wealth acquired by her arms; her riches protected the people against the attacks of the Barbarians; prolonged her resistance, and retarded her fall. In modern times, Venice, Genoa, Florence, the Hanseatic towns, Holland, and England, have at different periods alternately acquired, by manufactures and commerce, riches which have enabled them to act an important part in the political world, and even placed some of them, as our own country, in the rank of preponderating powers. With respect to Holland, Davenant observes, its territory contains only from eight to nine millions of acres: her population does not exceed two millions, and yet what a figure did she make in the seventeenth century! what wars did she sustain! what forces did she resist, and to what power did she attain! She is subject to frequent invasions: her harbours are bad: she annually spends immense sums not to be swallowed up by the sea; and all these difficulties have been overcome by her indefatigable industry, and her gains from commerce.

In comparing the advantages of agriculture with those of commerce and manufactures, it has been observed that agricultural produce is common to all countries, and has every where to struggle against a general competition; while commerce and manufactures are peculiar only to some countries, and some governments, and have of course no general competition to encounter. Agriculture does not require any great talents; nature performs a great part of the work: its improvements are slow, and the discoveries by which they may be hastened are soon known to all agricultural nations. The case is different with manufactures and commerce; they require a certain degree of intelligence, are continually improved, reach to a degree of superiority difficult to be attained, and rarely lose the superiority which they have once acquired. Agriculture is subject to accidents: the risks of industry and commerce are less numerous, and less fatal. Agriculture cannot extend its produce

duce beyond the extent of the territory and agricultural population; neither can it accumulate large quantities of its productions, because they would require immense costly buildings, and because they rapidly perish. Manufactures and commerce may multiply their productions without increasing the number of hands employed, and frequently even by diminishing their number. These productions may be stored up, at comparatively small expences, in proper warehouses, without any fear of their decaying before they are sold. Their consumption finds no limits but in the numbers of mankind, and in the progress of general wealth; that is to say, it is unlimited. Lastly, agriculture cannot build great hopes on the improvements of its methods. Notwithstanding the encouragements which have been bestowed upon agriculture by governments, and the efforts of learned societies, it has not, among the most enlightened nations, advanced much beyond the point at which it remains among the most ignorant; while the improvements of manufactures and commerce have been uninterrupted within the three last centuries, and promise still greater success from the discoveries of the arts, and the development of all the productive powers of labour.

Hence it is inferred, that without monopoly, or particular privileges, manufactures and commerce contribute more efficaciously than agriculture to the progress of wealth, and give to manufacturing and trading nations an absolute preponderance over agricultural nations.

It has, however, been said, that manufactures and commerce have only a temporary and precarious superiority over agriculture, and that the progress of knowledge and the arts are calculated not only to re-establish the equilibrium between those different labours, but even to incline the scales in favour of agriculture. To this it has been replied, an agricultural nation cannot become a trading and manufacturing one, but by the slow and uncertain progress of time, by the growth of local wealth, and the improvement of knowledge and the arts, or by a concurrence of circumstances over which they have no controul, and on which they cannot rely. If they attempt to force the natural order of things, and all at once to appropriate to themselves the benefits of manufactures and commerce, they cannot accomplish this but by taking from agriculture part of the hands and capital which caused it to flourish; that is, by injuring in a most material degree that upon which their subsistence depends. On the other hand, the unskillfulness and inexperience of new manufacturers and merchants yield, for a long time, none but productions of inferior value, and which, of course, cannot stand the competition in the general and particular market. The attempt, therefore, of transforming at once part of an agricultural nation into manufacturers and traders, is equally prejudicial to agriculture, manufactures, and commerce, and is accordingly productive of the decay of national wealth.

On the other hand it may be said, that so far from having any thing to apprehend from the progress of manufactures and commerce among agricultural nations, this progress would afford manufacturing and trading nations new means of prosperity and wealth; because when an agricultural country, supplied by foreign manufactures, establishes national manufactures to supply herself, and to share in the benefits of the general market, she gives to her labour and capital a direction more useful and more profitable than before, and consequently becomes richer by all the profits derived from her new manufactures and trades. The new demand, thus created, of the produce of ancient industry necessarily raises its price, increases the gains of the ancient producers, favours their manufactures and commerce, and

accelerates the growth of general wealth. The increase of national wealth occasions a larger importation of foreign productions, and these imports are necessarily an increase of wealth to the producing nations: hence the introduction of manufactures and commerce among agricultural nations, which is to them an increase of wealth, cannot be prejudicial to the prosperity of manufacturing and trading nations.

The trade of nations with each other has been too frequently regulated by the example of the individual trade of a country; and as it is found that the number of manufacturers and traders of a village or town cannot be increased, without every one of them suffering more or less from the competition, it was inferred that the same thing would happen to manufacturing and trading nations, in proportion as their numbers increased in the world. But the cases are essentially different. The industry and trade of a village or town draw all their means of getting rich from the wealth of the place, and can prosper only in proportion to this wealth, and its increase, over which they have no controul. Thus confined, trade and industry are merely passive, and destroyed by their own efforts. But this is not the characteristic of manufactures and trade generally: they act a more important part in the formation of wealth, and so far from being burdensome, they are its firmest support. Wherever they enjoy all their elasticity, they bestow productiveness upon existing wealth, accelerate its progress, and carry it to the highest pitch which it can attain; they assign to labour the most beneficial direction, to capital the best employment, and to the circulation of produce the most rapid and most profitable activity.

“When sir Richard Arkwright,” says M. Ganilk, “invented the cotton spinning machine, he shortened that kind of labour by two-thirds, and rendered it twenty times more productive than it had been before: he improved the manufacture of cotton, so as to make it an object of luxury to the rich; and lowered its price, so as to enable the less fortunate class to wear better garments: in short, he insured to this kind of industry a superior value in exchange over the other productions of general industry; and the result of his invention was less labour, and more produce, smaller expences, and greater value. This saving in labour and expence, this increase of produce in value and quantity, is a real increase of public and private wealth, and in every respect assimilates the skilful mechanic, to whom it owes its birth, to the husbandman, who, by his labour, increases agricultural produce. What is here observed concerning sir Richard Arkwright, applies to all who have made any improvements in science, manufactures, and arts, from the invention of the plough to the spinning machine. They all were creators of wealth in the ratio of the expence saved in the performance of labour, or of the higher value given to its productions.”

Commerce is exactly on a par with manufactures, and contributes in the same manner to the growth of wealth. Merchants, by following navigators on all coasts, and travellers in all climates, to open commercial communications with their inhabitants, by bringing to market the produce of unknown countries, and in exchange for this, which is of no value to the owners, giving them other useful and agreeable productions, are actually creators both of this new produce, and the equivalents which serve to pay for it, and augment public and private wealth by the whole value of this produce, and its equivalents. There is, therefore, a kind of industry which is not paid for by local wealth, which draws its wages from the wealth which it creates, and which can never obstruct any kind of manufactures; which can neither be impoverished by, nor impoverish any: all

all may prosper by each other's side, lend each other mutual support, and be so much more beneficial to general wealth as they are more numerous.

The superiority of the mercantile over the agricultural system, is particularly manifest with regard to political power and independence. In the mercantile system, the manufacturing and trading classes are able to spare, for the service of the country, a great number of young men, without any prejudice to general labour. The diminution of workmen is repaired by more exertion, more assiduity, and a better employment of time on the part of the other labourers. And should the produce be diminished, its value is increased by its scarcity, the national income always remaining the same. Even in war, manufacturing and commercial nations find in their foreign relations, in the circulation of their produce in all parts of the globe, and in their credit, facilities and resources from which agricultural nations are debarred: so that, on the whole, we may conclude, that if labour has the greatest share in the formation and progress of general wealth, their productiveness is not the exclusive lot of any particular labour, but is common to labour in general, and eminently connected with manufactures and commerce. This concurrence of labours is calculated to produce wealth, without any other pre-eminence than that which is obtained by the exchange of their productions. By this system all follow their own inclinations, develop and improve their own faculties, encourage and improve each other by a noble emulation, and are every instant of time reminded of their need of each other. Though scattered over the globe, speaking different languages, and following different customs, men are no longer strangers to each other; they labour one for the other; they correspond together, although separated by deep seas, severe climates, inaccessible mountains, and inhospitable deserts, and thus the produce of general labour is circulated all over the world.

We are now to enquire into the *causes which invigorate labour, improve its powers, and meliorate its produce*. Dr. Smith ascribes all its improvements to the division of its parts, or the confiding to several hands the different branches of the same labour, which gives each labourer more dexterity, avoids the loss of time occasioned by the change of labour, and is conducive to the invention of machines which shorten and facilitate labour, and enable one individual to perform the labour of many. On this principle the writer just referred to reared his system of political economy, and it has generally been considered as one of the facts which have most accelerated the progress of political economy, and most contributed to the celebrity of its author. But the earl of Lauderdale has controverted the principle: he contends, in the first place, that the idea of the effects of the division of labour is not new; that it has been recognized from the days of Xenophon; and that on this principle professions in ancient times had been made hereditary: he adds, that the great number of distinct operations that contribute towards the formation of some of the most trifling manufactures, as pin-making, is not derived from any degree of habitual dexterity, or from the saving of time as results of the division of labour, but from the circumstance of supplanting and performing labour by capital. Without the machinery, which the faculty that man possesses of supplanting labour by capital introduces, no great progress could have been made in the rapidity with which pins are formed; and one man, with the use of this machinery, though he goes through and performs all the operations himself, must manufacture more pins in an hour, than would be formed in a month, or a year, by any number of men among whom labour could be divided, if unaided by the circumstance of part of

their labour being supplanted and performed by capital. The noble earl produces facts in support of his position, and concludes generally, "that it is to the introduction of some sort of machinery; to the effect of the application of chemistry to manufactures; and to the increase or command of capital enabling the manufacturers to reduce the price of manufactured commodities, that we are indebted for the wealth and comforts generally enjoyed by civilized society."

It is of no consequence to the general question whether the effects of the division of labour were or were not known to the nations of antiquity, but it is important to enquire whether machinery or the division of labour be more conducive to develop the energies of the labourer, improve his faculties, and increase his produce. The division of labour imparts to the workman not only greater facility, dexterity, and intelligence, to perform the business which he has undertaken, but it distributes every part of the labour in the manner best calculated to hasten and improve its performance: so that if it even were true that the labourer receives greater assistance from machinery than from the division of labour, yet it would appear, that with regard to labour in general, the distribution of the different parts of labour renders services superior to those of machinery. Hence the division of labour appears to be entitled to be compared with the direction of labour. Machines may be more diligent, more active, and less expensive labourers: but the division of labour is the undertaker that directs them, regulates their motions, and guides them to their end by the straighter and, of course, the shortest line. The division of labour prepares the links of that immense chain which connects individuals with individuals, families with families, nations with nations, and converts the whole world into a single workshop,—a general manufactory. If, however, the division of labour be so advantageous in manufactures and commerce, the thing is not at all evident in agriculture. It is still a subject of debate, whether large or small farms are more beneficial to a country. Dr. Price, in his *Reversionary Payments*, said there was no maxim of political economy more true than this, that the division of property, that is of land, into small farms, increased population, and, of course, the strength of the country. Arthur Young, in his *Political Arithmetic*, assumes that it is not the number of people, but their wealth which constitutes power; and that population ought to be subordinate to agriculture, so that the abundance of produce should constantly precede the increase of population. As it is admitted that large farms yield a larger quantity of produce, than they would if divided into small ones, or what is the same, they yield an equal produce at less expence; should this saving of costs be obtained at the expence of the husbandmen, so as to diminish their number, population even would not be a sufferer, and wealth would be a considerable gainer. The husbandmen who are become useless to agriculture, still find subsistence in its produce, but being obliged to reproduce, at least, its equivalent by other labour, general wealth is increased by the total sum of this equivalent, and thus it is inferred, that with regard to population and wealth, the division of labour applied to agriculture, or the system of small farms, is as hurtful as it is beneficial in its application to manufactures and commerce.

To enquire into the actual utility of machines, of which lord Lauderdale speaks so highly, we must distinguish between machines that perform labour beyond the strength of man, and those that perform labours which man is capable of performing. With regard to the former, they are always profitable, and can never be prejudicial, since they afford

productions

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productions which exceed human strength and dexterity, and could not exist without their aid. With respect to those machines which barely supplant the labour of man, it has been remarked, that they are not prejudicial to nations whose prosperity is on the increase, because they merely supply the want of hands; but nations whose wealth is stationary, or retrograding, have no need of them. This distinction does not seem to rest on any solid foundation, if it be considered that they are not introduced suddenly, but slowly and partially, and the labourer, who through the erection of machines is deprived of his usual employment, likewise obtains his wages from new manufacture, the establishment of which every where follows the increase of productions and general wealth, and thus the labourer is not likely to suffer by the introduction of machines, whatever may be the state of the country. To this it may be added, that if any thing can arrest the decline of a country, and restore her to prosperity, it would be the use of machinery, and the concentration of small farms into large ones, because they would augment the produce of her labour, and diminish its cost. And wherever there is an increase of produce at a smaller expence, there is an increase of wealth, and an increase of wealth is uniformly followed by an increase of population.

It has been asserted, that wealth acquired by industry may be useless to the increase of the industrious population, and even augment to their prejudice the agricultural population, by which they are supplied with the raw produce of agriculture. But in reply it is said, that an agricultural country increases her raw produce only as far as trading countries insure its sale. The increase of the wealth and population of agricultural nations depends, therefore, on the industry and population of the manufacturing ones. But in what proportions does the increase of wealth and population take place in both countries? It has been said by Garnier, that one day's labour in the manufacturing country, is equivalent to two or three days' labour in the agricultural country; therefore, while the wealth and population of the agricultural country are increased in the proportion of one to three, the wealth and population of the manufacturing country augment in the proportion of three to one. Again, the raw produce of an agricultural country is not by any means so well calculated to increase population as a manufactured produce; for the raw produce does not remain with agricultural nations: it passes over to the manufacturing nations. This raw produce is food for population, while the manufactured produce serves at the most as raiment and household furniture to agricultural nations. In this exchange of food for garments, the population that gets the food in a triple proportion to that which gets clothing, must necessarily increase in a triple proportion; because it is food and not clothing which augments population. This result, which cannot be disputed, ought to teach agricultural nations the necessity of turning their attention to manufactures and commerce, on account of their superiority over agriculture.

The inference deducible from what is gone before is, if our reasoning be conclusive, that the means of increasing the power of labour, of augmenting its produce, and meliorating its quality, consists, with regard to agriculture, in large farms; and with regard to manufactures and commerce, in the division of labour and the use of machinery. These means give to labour the highest degree of utility which it is capable of attaining, particularly if their effect be not impeded or destroyed by various obstacles, so much the more fatal as opinions are divided concerning their influence. These obstacles, said by some philosophers to be prejudicial to the progress of labour, and by others considered as bene-

ficial, are, the slavery of the labourer, apprenticeships, corporations, and low wages. On these subjects we cannot enlarge, but shall give certain statements illustrative of our subjects, chiefly taken from some admirable papers published in the beginning of that useful and respectable work entitled the "Monthly Magazine," by the late Mr. J. J. Grellier, once an able contributor to the New Cyclopædia. Assuming from the parliamentary returns of the population of Great Britain, including the army and navy, at 10,820,370, he endeavoured to distinguish, as nearly as he was able, the proportion of those who subsist by the labour of others, to those by whom they are supported; and of the unproductive, though, in most instances, useful labourers, to those on whose labour the annual produce, and consequently all additions to the national stock, depend.

It appears, that of the whole number of persons living, more than one-fourth are children under ten years of age, who therefore contribute little or nothing to their own maintenance; for though in a few manufactures, children under this age are employed, they are more than counterbalanced by the greater number who remain unemployed for several years beyond the age of ten. After deducting 2,705,092, it will be found, that one in about 28 of the remainder, or 289,831, are incapacitated by old age or infirmities from useful labour, including all persons in hospitals, &c. and most of the inhabitants of alms-houses, and other charitable establishments. But of those who are supported by the labour of others, or by the property of others, which comes to the same thing, there are many who follow a species of employment, by which they obtain this property, which employment is, however, of no benefit to the country, as it is not only unproductive, but useless, and in many instances injurious to the community; such are gamblers, swindlers, thieves, prostitutes, beggars, gipsies, &c. whose aggregate number, according to Mr. Colquhoun's estimate for the metropolis, probably exceeds considerably 150,000. The convicts and prisoners confined in the different prisons of Great Britain, and on board hulks, are usually about 10,000 persons, whose labour is lost to the community, for the work which is performed in some of our gaols scarcely deserves mention. There is also a class of a very different description, who are supported by the labour of others: this is the nobility and gentry, whose exemption from labour is considered as a part of their honour and distinction; some, it is true, hold employments under the government, and a few are engaged in agriculture or trade; but the majority, who subsist on the income they possess, without following any useful occupation, is probably not less than 5000.

These numbers include persons of both sexes, and are all rather below the truth than beyond it; they amount together to 3,159,923 persons, and being deducted from the whole population of 10,820,370, shew the number of those who work to be 7,660,447. But it is well known, that of those who gain a subsistence by their labour, many follow employments which, though more or less necessary and useful, do not, in the least degree, increase the quantity or value of the produce of the country; the number of these unproductive labourers is nearly as follow:

The army, officers and privates, including half-pay, commissaries, agents, &c.	} 200,000
The navy, ditto	} 127,000
Officers and clerks employed in collecting the revenue, and in other offices under government	} 6,500
	<hr style="width: 100%;"/>
Carry over	333,500

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Brought forward -	333,500
Clergy of the church of England and Scotland -	18,000
Ditto, dissenters of every denomination - -	14,000
Schoolmasters (exclusive of clergymen) and } Schoolmistresses - - - - - }	20,000
Judges, counsel, attornies, sheriff's officers, jailors, } and all persons employed in the execution of } the laws, except constables, headboroughs, &c. }	14,000
Players, musicians, dancing masters, &c. -	5,000
Women supported by their husbands' labour -	500,000
Female servants of all descriptions - - -	650,000
Male servants - - - - -	150,000
	1,704,500

It must be confessed that the number of some of these classes of persons cannot be ascertained with much precision: this, however, is of no great importance, if the total is not far from the truth, as the object is chiefly to shew the proportion of productive to unproductive labourers; the latter may be distinguished according to the following statement:

Merchants, brokers, factors, and others depend- } ing on foreign trade - - - - - }	25,000
Clerks to ditto, and in the offices of commercial } companies - - - - - }	40,000
Seamen in the merchants' service, including the } coasting-trade and fisheries - - - }	144,000
Lightermen, watermen, &c. - - - - -	3,500
Persons employed in the different manufactures	1,800,000
Mechanics not immediately belonging to the } manufactures, such as carpenters, bricklayers, } masons, wheelwrights, shipwrights, boat- } builders, &c. - - - - - }	50,000
Painters, engravers, carvers, and other artists -	5,000
Shop-keepers, viz. butchers, bakers, publicans, } fishmongers, poulterers, pastrycooks, grocers, } chandlers, pawnbrokers, apothecaries, &c. }	150,000
Farmers, graziers, and all other persons em- } ployed in agriculturre, including millers, } mealmen, farriers, horse-doctors, &c. - }	2,000,000
Wives and families of most of the above classes } assisting in their occupations, or following } other employments of profit - - - }	1,738,447
Total -	5,955,947

The whole population of the country will thus appear to consist of nearly the following proportions:

Supported by others' labour - - - - -	3,159,923
Unproductive labourers - - - - -	1,704,500
Productive labourers - - - - -	5,955,947
Total -	10,820,370

It thus appears that the whole of the people depend for subsistence, and all the conveniences of life, on the labour of little more than one-half; and the increase or decrease of this number, and of the effect produced by the individuals who compose it, is the measure of the increase or decline of national strength. Of the unproductive labourers, or those who gain a subsistence by defending, instructing, or serving others, the greater part are highly useful to the community, and in the present state of society a nation could not exist without them; but as they do not contribute to the production of any of the necessaries of life, or articles of commerce, it is evident that they depend entirely on the exer-

tions of the productive labourers, who are the source not only of the general subsistence, and of the means of commerce, but of all accumulation of stock, which is, in fact, the surplus of former produce beyond the consumption. The power of acquiring national wealth, therefore, depends principally on the proportion of productive labourers to the whole number of inhabitants; for though the population of a country should have greatly increased, if it had been chiefly by an addition of idle hands, the produce would remain the same, and the consumption being much greater, the country must become poorer: but it likewise depends, in a great measure, on the facility with which labour is performed; for if a country contained only half the number of labouring inhabitants, with the same number of other persons it had at a former period, but this half, by means of machinery and other improvements, could produce the same effect as the whole number before, such a country would become considerably richer, though the total population was diminished, and the proportion of unproductive to productive persons increased; for there would be the same supply and a much less consumption: and wherever the produce or supply exceeds the consumption, there will be an acquisition of stock; for, unless the surplus could be reserved for some useful or desirable purpose, it would soon cease to be produced, by the supply falling to the level of the demand for consumption. The surplus reserved, or converted into stock, is a fund for supporting an increase of exertion, or for supplying the means of future enjoyment.

We now proceed to consider a second important subject in the science of political economy, viz. the various systems concerning capital. On this topic, the theory of Dr. Smith is, without dispute, new. The subject, before his time, was not at all understood. The writers on political economy made capital consist entirely of metallic currency, and derived it from foreign commerce; hence their system was denominated the mercantile system. The French economists, who substituted the agricultural system, acknowledged no other capital than the advances on cultivation. Dr. Smith took a larger view of the subject; and capital, according to his theory, consists in the advances and prime materials of all kinds of labour—in the improvements of soil—in the implements and machines for the purposes of agriculture, manufacture, and trade, which, of course, comprise both metallic and paper currencies—and likewise in commodities reserved for general consumption. The latter may fairly be objected to, though our limits do not allow us to enter on the subject; yet it cannot but be matter of surprise that the doctor should enumerate with capital, commodities reserved for consumption, and incapable of being accumulated. Some modern French authors assign to land, mines, and fisheries, which they regard as instruments of production, the rank of capital; but lord Lauderdale limits capital to the instruments and machines adapted to shorten and facilitate labour. The author to whom we have frequently referred, and shall refer again and again, M. Ganilk, defines CAPITAL to consist in the accumulation of the produce of labour, and he adds, that “according to this definition, lands, mines, and fisheries, in their original state, would not be comprised among capitals; and stripped of the improvements, instruments, and machines which render them productive, they scarcely deserve to hold a place in the capital stock of a nation. Their spontaneous produce is but the smallest part of the general produce of labour, and cannot contribute any separate article in the wealth of nations. If we deduct from agricultural produce the part which is due

to cultivation; from the produce of fisheries, that which is due to the implements and tools for fishing, and particularly to the art of salting, drying, and curing fish; and from the produce of mines, that which is due to the aid of machines and extraordinary labours; there remains so little, that there is no danger of erring in ranking them among the produce of labour, and admitting them only as such among capital."

Capital offers three different considerations, equally interesting to the science, to its progress, and to its results; *viz.* its formation, employment, and influence upon public and private wealth. According to Quesnai, capital is derived from economy in the costs of agricultural labour; from the savings in the expences of the land-owners, as far as those savings are applied to improve the soil; and from the increased price of commodities through foreign trade: and, therefore, nothing contributes to the formation of capital, but the saving of the net produce, when employed in agricultural improvement. And Dr. Smith derives capital from the greater or smaller quantity of productive labour relatively to unproductive labour; from the proportion of the productive to the non-productive consumers; and from economy in private consumption: and he adds, *capital* is increased by parsimony, and diminished by prodigality and misconduct. In one principle, Quesnai and Smith agree, the one faithful to the agricultural system, and the other to his system of productive labour; they both regard none but the savings applied to agricultural or productive labours as proper to form capital. In whatever way economy may be effected, it leaves at liberty a sum of produce which is consumed by the idle, or by the labouring classes. If by the latter, it serves to pay for more labour, or for useful labour to be better done. Increased or improved labour gives more or better productions, and consequently more wealth. Higher wages, at the same time, procure more comforts to the labouring class; and more comforts become the cause of a greater population. Thus the savings consumed by the labouring classes evidently increase both wealth and population. When the savings are consumed by the idle classes, they serve to employ a greater number of individuals in labours of luxury: and it matters little whether the savings be made by the idle classes, or whether they be borrowed by them from the labouring class. In the first case, the savings serve only to augment the population; in the second, the savings of the labouring class are exchanged for the capital of the idle classes; and this exchange is not at all injurious to the national capital; it simply effects a change of capitalists, which is perfectly indifferent to the formation of capital and wealth, and is in no-wise prejudicial to population. It seems, therefore, clear that Quesnai and Dr. Smith were mistaken in assuming that savings cannot contribute to the formation of capital, except they are applied to agricultural or to productive labour. They clearly contribute to the formation of capital, though they are employed in labours of luxury. This kind of labour, the least beneficial, indeed, to wealth, constantly and infallibly replaces the savings by which it is paid, and constantly produces the population which is maintained by these savings. Hence it is given as an axiom, that *capital is always derived from economy, and can neither be formed nor increased otherwise than by economy.* This system has been opposed by the earl of Lauderdale, who makes the property of a society chiefly occupied in agriculture, to consist in the land which he cultivates—the stock he reserves for immediate and remote consumption—and his *capital*, which consists of the animals or machines which he employs to save labour in the cultivation of his farm, or in the convenient consumption of its produce. If, however, wealth result from the accumulation of the

surplus of the produce of labour over consumption, it may certainly be increased by other means than by those mentioned by the noble lord, *viz.* by economy, which he seems to hold in great contempt.

Suppose a nation accumulate a certain sum annually, it is either distributed to individuals, whose situation is rendered more comfortable, and who pay for it with more or better labour—and in this case it acts as an encouragement to labour and industry, and multiplies the means of public and private wealth; or it is given to individuals taken from the labouring and industrious classes, to be employed in the service of the idle and rich: in that case also it increases population by all the individuals it maintains. Such is the natural effect of economy, and of an increased produce; both contribute to the progress of population and wealth. There are no limits to this progress, but in the utmost extension and improvement of agriculture, manufactures, commerce, population, and civilization all over the world. People, therefore, ought never to relax in endeavouring to increase their produce, and being economical in their consumption. It is certain that consumption is the measure of production, for a produce that finds no consumer, is not long reproduced. It must not, however, be inferred, that an abundant, and even an over-abundant produce is not consumed. The abundance of productions is always an excitement to a greater consumption; and as abundance, is wealth. Wealth in its turn affords the greatest possible means of consumption. Production is limited by consumption; when the consumer does not like the commodities produced, or when he is unable to pay their price. The producer is every where obliged to consult the taste and faculties of the consumers, and it is when he is mistaken in these two respects, that non-consumption is detrimental to reproduction. Produce will always be consumed, provided it suits the consumers, and they have the means of paying for it. Abundance and cheapness are the springs of consumption and reproduction; and as economy necessarily produces both, it follows that economy is beneficial to both.

If this reasoning be correct, it is not possible that capital can, according to the theory of the earl of Lauderdale, consist only in machines and instruments proper to shorten or facilitate labour, because an economy which tends to multiply such a capital beyond real wants would be injurious instead of beneficial. Hence the capital recommended by the best writers, consists in the advances and raw materials necessary to all kinds of labour; in the improvements of the soil; in the instruments and machines proper to facilitate labour; and in the produce kept in store for present, future, and distant consumption. In this way the means of labour are increased; the soil is rendered more productive; the productions of industry are more abundant; of a better quality, and at a lower price; and their very abundance is a premium to augment population, and means of private and public wealth. Thus economy, by extending every branch of capital, has the same effect as the productiveness of the soil, the progress of industry, and the speculations of commerce. It augments public and private wealth; and it is economy and not industry which increases the capital of a nation.

We are now to enquire in what manner capitals are employed. M. Quesnai mentions the following ways: 1. In the original advances, which have cleared the ground: 2. In the annual advances, which reward the labour of the husbandmen, preserve the original advances, and provide against accidents: 3. The advances which serve to pay for the raw materials and wages of labour: and 4. The advances of the merchants who defray carriage and warehouse expences. Dr. Smith took a more enlarged view of the subject; he devotes one part of the capital to immediate consumption,

sumption, consisting of food, clothing, household furniture, houses, &c.; a *second* part he calls fixed capital, which affords a revenue without circulation or changing masters; this consists in useful machines which abridge labour—in buildings that procure a revenue not only to the proprietor, but to those who pay rent for them—in the improvements of land—and, lastly, in the talents of all the inhabitants of the society. The third and last portion is the circulating capital, and is composed of money—of the stock of provisions, from the sale of which a profit is expected—of the materials, whether rude or partly manufactured—and fourthly, of work ready for sale, but not disposed of.

The difference of opinion between M. Quesnai and Adam Smith is the consequence of their different theories concerning the source of wealth; which one places in agriculture, and the other in any labour which fixes and realises itself in some permanent object.

That part of the capital stock which Adam Smith denominates the circulating capital, is nearly the same with that which M. Quesnai calls annual advances. Both intend this part of the capital stock of a country to provide for the divers wants of agriculture, manufactures, and commerce; they only differ in so far as Adam Smith admits the metallic currency of the country into the circulating capital, which is not mentioned by Quesnai. But the theory of circulation, of which a metallic currency is the principal instrument, had made but small progress at the time the French economists wrote, and its benefits could not easily be foreseen; nor its extent, resources, and results calculated.

Dr. Smith says, that the metallic currency of a country forms part of her circulating capital, and is not only of no benefit to wealth, but even burthensome to it as an object of expence. Other writers on this subject imagine, that money operates in the same manner as other machines employed in agriculture, manufactures, and commerce, and tends like them to shorten labour, and is productive of whatever the exchange of commodities costs, less than what it would have cost without the assistance of money. Of this number is the earl of Lauderdale, who has treated the subject in a very luminous manner, and who explains, in a novel and ingenious method, the operation of money in the interchange of the produce of labour. For his lordship's reasoning and illustrations on this subject, we must refer our readers to the third chapter of the "Inquiry into the Nature and Origin of Public Wealth." Money, says the noble lord, is of use to mankind in two different capacities, as an instrument of exchange, and as a practical standard, by which the value of all commodities is measured and expressed: it will be easily understood how this part of the national capital employed in these two duties is profitable, when we reflect what would be the effect of withdrawing from any society, that part of the capital which is employed in conducting the circulation of goods, and in forming a practical standard by which the value of commodities is measured; for the moment this portion of the national capital is abstracted from any society, the exchange of those things which one man produces with greater ease, for those which another can produce with more advantage, must be conducted by barter. Thus, if a farmer who had more wheat than he wanted, and who meant the surplus to supply his family with other necessaries, wanted a pair of shoes, he must carry a portion to a shoemaker in order to negotiate an exchange, but the shoemaker is already supplied with as much wheat as he wants; the farmer must either seek another shoemaker, or ascertain what articles of consumption the first wants, in order to make a third or a fourth exchange before he could get his shoes. This single instance, which any reader can easily conceive and follow into all its conse-

quences, will explain the labour that must attach to every person, if the circulating capital of a country were obstructed, in endeavouring to supply his wants by parting with his superfluities. Thus coin, employed as a circulating capital, has been eagerly sought after, not for its own sake, or for the sake of the gold and silver it contains, but merely on account of the labour it supercedes. It not only, however, requires a certain portion of labour to acquire, but also to carry about when procured. To prevent this, various modifications of banks have been introduced. Hence the question, do bills of exchange, paper-money in general, and public stocks form capital; and if so, are they part of the *fixed* or *circulating* capital? They seem entitled to be regarded as capital, because they perform the functions of capital; on the other hand they ought not to be regarded as capital, because they have no value of their own, and only represent a mortgage, which itself constitutes a part of capital. Bills of exchange represent the merchandise which they cause to circulate. The mortgage of private promissory notes, consists in the moveable and immoveable goods of the debtor; and public funds or stocks have their mortgages in a particular branch of the revenue. This merchandise; these moveable and immoveable goods; and this branch of public revenue, constitute part of the *fixed* capital, of the *circulating* capital, and of the *stock* reserved for immediate consumption.

The effect of *hoarding* has been considered as a fit subject of consideration in the science of political economy, though overlooked in the "Wealth of Nations." Metallic currency is, as we have seen, a mere instrument, proper to circulate the produce of labour, whatever this produce may be. Abstracted from this destination by being hoarded, it becomes like a merchandize that is not in commerce; and which, so long as it remains out of it, has no value or use for any one. It is, in fact, as if it did not exist, as if it were still buried in the bowels of the earth. When hoarding is the effect of a passion for gold and silver, it is of little importance with regard to wealth, because it is never attempted to any great extent. The only mischief that arises from it is, that it occasions a little more expence to the nation in the purchase of precious metals. Hoarding becomes of public importance only when it takes place in consequence of political causes or mal-administration, when the minds of men are uneasy about public affairs. Instances of such kind of hoarding are met with wherever government respects not persons and property, nor causes them to be respected; and in times of political commotions. Against this calamity political economy affords no remedies: science loses its power; and all those measures, which political economy disavows, are but miserable palliatives which aggravate the evil, and delay its cure, or render it impracticable.

Capital stock, considered as *fixed* capital, as *circulating* capital, and as capital destined for immediate consumption, provides for the wants of labour, contributes to its progress in proportion to its own increase, and always affords an exact measure of the progress of national wealth. There is a fourth employment of capital, by its being lent out to interest, either to private individuals or to the public. Writers on political economy are not all agreed respecting either the utility or disadvantages of this kind of employment of capital. Without entering into the discussion here, we shall refer to the article BANK, also to the latter part of our article INTEREST; LOAN-banks; LOMBARDS; likewise DEBTS, *National*, and FUNDS, *Public*.

In considering the influence of capital on the progress of public wealth, Dr. Smith asserts, that "capitals of equal value will put into motion very different quantities of productive labour, and augment in different proportions the value

value of the annual produce of the land and labour of the society to which they belong, according as they are employed either in procuring the rude produce for use and consumption; in manufacturing and preparing that rude produce for immediate use; in transporting either the rude or manufactured produce from the places where they abound to those where they are wanted; or, lastly, in dividing particular portions of either into such small parcels as suit the occasional demands of those who want them." He accordingly assumes that no equal capital puts in motion a greater quantity of productive labour than that of the farmer, because nature performs seldom less than a fourth, and frequently more than a third of the labour; and no equal quantity of productive labour employed in manufactures can ever occasion so great a production. Next to the capital of the farmer he ranks that of the manufacturer, "who augments the value of the raw materials, which he employs by the wages of his different workmen, and by his own profits on the wages, materials, and instruments of trade. To the capital of the wholesale merchant he assigns the last rank, because it augments the price of his goods only by the value of his profits and the wages of the carriers. He then considers the difference according to the different sorts of wholesale trade in which any part of the capital is employed. The capital employed in the home trade is the most lucrative, because its returns are most frequent; the capital employed in the foreign trade of consumption is less productive than that employed in the home trade, because the profits are shared between the native merchant and the foreign one: but the capital employed in the carrying trade is the least productive of all, because it is altogether withdrawn from supporting the productive labour of the country to support that of some foreign countries.

Dr. Smith's theory on this part of the subject has been ably combated by M. Ganilk, who admits that nature does a considerable part of the farmer's labour, because the produce of labour is not valued by what it cost, nor by its use, but by its *value in exchange*; of course it matters little whether the agricultural produce costs more or less to be raised, if it has not a greater value in exchange. It is, therefore, neither this nor that particular produce which constitutes wealth: it is the exchangeable value of all produce; and the capitals which confer the greatest exchangeable value upon the produce of a country, are the most useful and most favourable to the wealth of that country. Capitals employed in manufactures and commerce are eminently possessed of that faculty, because they afford the produce most in request, and find consumers and commodities in exchange for it in every part of the globe. The nation which employs its capital in manufactures and commerce, is therefore nearer the source of wealth, than the nation which employs it in agriculture, and which, in truth, can derive no wealth but from the prosperity of manufactures and commerce. Besides, the characteristic of the mercantile system is every where to stimulate labour, to accumulate its produce, and to increase wealth; hence the mercantile system is as preferable to the agricultural system, with regard to the employment of capital, as with respect to the nature and effects of labour; and the greater their progress in manufactures and commerce, the nearer will they be to wealth, and their wealth will be so much larger, the more capital they employ in manufactures and commerce. This result is also obtained from the propensity of man to exchange commodities, and from his fondness for all those enjoyments which can be had only by means of such exchanges. It has also been asked, if, in spite of those institutions which oppose the development of industry and commerce, it is not still to manufactures, commerce, and the arts, that the most in-

dustrious, the most ingenious individuals, those whom nature and education have endowed with most talents and faculties, devote themselves? and is not agriculture the lot of men the least endowed by nature, and the least disposed to occupations which require dexterity and talents. This tendency of men to industry and commerce, renders it impossible to be blind to their advantages, or even for a moment to give so decided a preponderance in favour of capitals being employed in agriculture. The most profitable capitals are not those which put most labour, but the most useful labour, into motion; not those which employ most, but the most skilful individuals; not those which yield the largest, but the most valuable produce: consequently the most profitable capitals are those employed in manufactures and commerce. Such is the theory of M. Ganilk.

With regard to the profit of stock, the rule which directs us in the research is, according to Dr. Smith, the rate of interest of money in a given country, and at a given time. As the usual market-rate of interest varies in any country, we may be certain that the ordinary profits of stock must vary with it, must sink as it sinks, and rise as it rises: hence Dr. Smith draws various consequences relative to the progress of wealth in France, England, Holland, and Mexico. This rule is, however, liable to several exceptions, which render its application uncertain. In general, the profits of stock decrease in proportion to the increase of wealth, and augment in proportion to its decline. When a country possesses the sum of capital which it wants, the profits of stock are very low. From this doctrine the following corollary has been drawn, *viz.* that the operations of governments, when not conducted with knowledge and prudence, may have the most distressing influence on all the relations of a country, individual, social, and foreign. If government derange the natural rate of the interest of money, the private interests of all suffer: the land-owner is sacrificed to the capitalist, or *vice versa*; agricultural, manufacturing, and commercial undertakings are carried on beyond, or stop short of their means; and in both cases labour is a sufferer, and wealth declines. Again, if government do not avail itself of the new methods which the science of capital has introduced in other countries, the nation over which it rules labours with equal capital under a great disadvantage in its dealings with other nations, and for a length of time contributes to enrich them at its own expence. The employment of capital is one of the most difficult branches of the science of public administration; and whatever governments may do, capital always has a great value wherever national wealth declines, and it constantly loses its value in proportion to the increase of public wealth.

We shall now briefly consider the various systems relating to the circulation of the produce of labour by means of commerce, which is the only method by which nations attain wealth, splendour, and power. "Trade," according to Dr. Davenant, "is the living fountain whence we draw all our nourishment. It disperses that blood and those spirits through all the members, by which the body politic subsists. The price of lands, value of rents, manufactures, &c. rise and fall as it goes well or ill with our foreign trade." "The greatness of a state, and the happiness of its subjects, are," says Mr. Hume, "generally allowed to be inseparable with regard to commerce." M. Quesnai observes, "Like sale, like production." An able Italian writer on political economy, M. Genovesi, says, "The end of social economy is, 1st, increased population; 2d, wealth; 3d, natural and civil happiness; 4th, the grandeur, glory, and welfare of the sovereign. Of all the means of attaining this end, there is not one more efficient than commerce, which avails itself of human avidity, as the

most powerful promoter of all social advantages." To these testimonies in favour of the circulation of produce, by means of commerce, we may add that of our countryman, Dr. Adam Smith. "As it is the power of exchanging that gives occasion to the division of labour, so the extent of this division must always be limited by the extent of that power, or the extent of the market." Hence the importance of commerce, or of the circulation of the produce of labour. In this point all writers on political economy are unanimous; but with regard to the principle, nature, progress, and effects of this beneficial circulation, opinions are very various. The origin of commerce is sought for, by some, in the avarice of mankind; by others, in their propensity to barter, and exchange one thing for another; and by others, in their variety. The same sort of uncertainty prevails respecting the laws which determine the respective value of the produce exchanged by commerce, concerning the influence of money and credit upon commerce, and concerning the most useful and profitable mode of commerce.

Without attempting to decide upon the origin of commerce, we may observe that no one parts with the produce of his labour, and puts it into circulation, but in the expectation that it will procure him more food, or greater conveniences, comforts, and enjoyments: hence the farther circulation extends, or the larger the market, and the more that market offers varied productions and new enjoyments, the more does labour increase in intensity and activity, the more its produce multiplied, and wealth enlarged and augmented. The sources of the circulation of the produce of labour may be traced in the passion for enjoyment, in the efforts of commerce, and in the genius of the arts. To their united action commerce owes its impulse, its progress, and its success.

The value of produce is regulated by the wants of the consumers, and their means of supplying them; by the demand for commodities, and their abundance and scarcity; by labour, &c. Most writers on this subject are of opinion, that things have no other value than what is fixed by the demand for them, and their abundance or scarcity. One writer observes, that the words *price*, *worth*, *value*, are relative terms, because things have no price or value but relatively to man: wherever there are no men, there are no values; but man assigns no value to things, but as he wants them. By another person it is said, that the sole capability of being exchanged, combined with the greater or smaller natural abundance of things, and with a more or less ardent desire to be possessed of them, forms the basis of what mankind denominate value. The price of things, according to another author, is composed of two elements—their utility and their scarcity: of course their value increases with their scarcity, and diminishes with their plenty. Dr. Smith observes, "that the value of any commodity to those who possess it, and who want to exchange it for some new production, is precisely equal to the quantity of labour which it can enable them to purchase or command: whence he infers that labour is the real measure of the exchangeable value of all commodities." The earl of Lauderdale opposes this doctrine. He maintains that a perfect measure of value is impossible: for as nothing can be a real measure of length and quantity, which is subject to variations in its own dimensions; so nothing can be a real measure of the value of other commodities, which is constantly varying in its own value. But things may alter in their value in three different ways: 1st, in respect to different periods of time; 2d, in different countries; 3d, in different parts of the same country. Labour is not only subject to all the usual sources of variation, but possesses the characteristic of varying at the same time and place: hence labour cannot be a standard. Money and corn are not better calculated than labour to fix

the value of things for distant times. As then the value experiences a rise and fall perfectly similar to the rise of the price of commodities, and as this variation in their respective values proceeds from the same cause, that is, from the proportion of the demand to their abundance or scarcity, there is no difference between their values: both are alike liable to vary, and consequently both are alike unfit to form an invariable measure of value; so that it is the exchangeable value which ultimately gives to every producer the equivalent of what his commodity cost to produce, and consequently secures the producers against loss. Beyond this the profits on productions of labour are unequal. This inequality of profits is indifferent with regard to home-trade: for the superiority of certain labours and employments of capital cannot be of long duration, because those which are least favoured go over to the most favoured ones, and by their competition re-establish a certain proportion between the profits of all labours and employments of capital. But it may be asked, is the inequality of profits in the exchange of home for foreign produce equally harmless? The question has been ably discussed, and decided affirmatively, with the observation that there is but one motive that should induce a nation to prohibit the importation of the produce of other countries; that is, when the government of our own country is so defective, that none of our home productions can stand a competition with foreign productions, even in the home market; when national industry is not capable of being stimulated by the rivalry of foreign industry; and when the people abandon themselves to sloth and misery. With this single exception, foreign commerce or general circulation is beneficial, useful, and profitable to all, and contributes, if not with equal, at least with certain, success to the progress of wealth.

In treating of the wealth of nations, which is the great object of political economy, we shall not omit the computations that have been given of what has been denominated the national stock or capital, that is, of the existing surplus which has been accumulated. In this part of our discussion we shall extract largely from Mr. Grellier's papers, already referred to. Previously to an enquiry into its increased amount, as taken at the commencement of the present century, we may cite the estimate of sir William Petty, whose computation of the wealth of England and Wales, in 1664, is as follows:

Value of land: 24 millions of acres, yielding 8 millions of pounds <i>per annum</i> , at 18 years' purchase	} 144,000,000
Houses, reckoning those within the bills of mortality, equal in value to one-third of the whole	} 30,000,000
Shipping: 500,000 tons, at 6 <i>l.</i> <i>per ton</i>	- 3,000,000
Stock of cattle on the 24 millions of acres, and the waste, including fisheries, warrens, &c.	} 36,000,000
Gold and silver coin (at that time scarce)	- 6,000,000
Wares, merchandize, plate, furniture, &c.	- 31,000,000
	<hr/>
	£250,000,000

"In comparing this estimate with similar accounts for the year 1800, or thereabouts, it must be remembered, that a great alteration has gradually taken place in the nominal value of all commodities, which, with respect to the above period, appears, from a table formed by sir G. S. Evelyn, to be in the proportion of about five to fourteen; the total of the wealth of England and Wales, in 1664, would

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would therefore have amounted to 700,000,000*l.*, according to the present value of money.

“ The value of land has progressively increased, in consequence of improvements in cultivation, and the increased consumption of the produce of land. Before England became a trading nation, the general price of land was twelve years’ purchase. At the beginning of the last century but one it sold for about sixteen years’ purchase: sir W. Petty valued it at eighteen years’ purchase; and at the commencement of the last century, it had advanced to twenty years’ purchase. About the year 1730, it had risen to twenty-five years’ purchase; and at present is from twenty-eight to thirty years’ purchase. The increase of the number of years’ purchase paid for land, is the most obvious proof of its augmented value; but it does not shew the whole augmentation of the national wealth on this account, which in part arises from the increase of the total rental beyond the advance that is caused merely by the difference in the value of money. This real increase of the rental proceeds from a greater proportion of land being brought into cultivation, and that which was before cultivated being improved. The whole landed rental of England and Wales, and the Lowlands of Scotland, was stated by sir W. Petty at about 9,000,000*l.*; and it cannot be supposed that, if he had included the Highlands of Scotland, he would have made the rental of the whole island more than 9,500,000*l.* G. King and Dr. Davenant, in queen Anne’s reign, stated the rental of England and Wales at 14,000,000*l.*; and it may be presumed this was nearly the truth at the time: but it soon began to appear too low; and between twenty and thirty years ago it was generally reckoned at 20,000,000*l.* At present, however, it considerably exceeds this sum.

“ The chief difficulty of forming an estimate of the land rental consists in assigning an average value to the different descriptions of land. The total number of acres in England and Wales has been computed by sir W. Petty to be 28,000,000; by Dr. Grew, 46,000,000; by Dr. Halley, 39,938,500; by Mr. Templeman, 31,648,000; by Mr. Arthur Young, 46,16,000; and by the Rev. H. Beeke, 38,498,572. Mr. Beeke’s calculation appears to be by far the most accurate: it is therefore taken as the foundation of the following statement; the proportions cultivated for different purposes being nearly as given by Mr. Middleton, in his View of the Agriculture of the County of Middlesex:

	Acres.
Wheat - - - - -	3,160,000
Barley and rye - - - - -	861,000
Oats and beans - - - - -	2,872,000
Clover, rye-grass, &c. - - - - -	1,149,000
Roots and cabbages cultivated by the plough	1,150,000
Fallow - - - - -	2,297,000
Hop-grounds - - - - -	36,000
Nursery-grounds - - - - -	9,000
Fruit and kitchen-gardens, cultivated by the spade	41,000
Pleasure-grounds - - - - -	16,000
Land depastured by cattle - - - - -	17,479,000
Hedge-rows, copses, and woods - - - - -	1,641,000
Ways, water, &c. - - - - -	1,316,000
Cultivated land - - - - -	32,027,000
Commons and waste lands - - - - -	6,473,000
Total acres in England and Wales - - - - -	38,500,000

“ If the commons and waste lands are considered as equal in annual value to only one million of cultivated

acres, the whole may be taken at 33 millions. The average rent has been stated at 15*s.* per acre, which appears to be a moderate computation, and makes the rental amount to 24,750,000*l.*, the value of which, at 28 years’ purchase, is 693,000,000*l.* The number of cultivated acres in Scotland is upwards of 9,690,000; and of uncultivated, about 11,310,000: a great part of the latter is of very little use; but if it is wholly excluded, and the cultivated part rated at an average of 10*s.* per acre, which makes 4,845,000*l.* per annum, the total rental of the island will be 29,595,000*l.*, and the value of the land 828,660,000*l.* This must be understood as including the value of tythes, it being unnecessary in this point of view to distinguish between the rent paid to the landlord, and the part paid to the tythe proprietor.

“ The value of the houses of Great Britain is perhaps more difficult to ascertain than that of the land: but the following statement of their rent, founded on the number returned under the population act, will not be thought too high:

100,000 houses, at 30 <i>l.</i> per annum	-	£3,000,000
500,000 - - - - - 10 <i>l.</i> - - - - -	-	5,000,000
250,000 - - - - - 5 <i>l.</i> - - - - -	-	1,250,000
600,000 - - - - - 2 <i>l.</i> - - - - -	-	1,200,000
425,000 - - - - - 1 <i>l.</i> 10 <i>s.</i> - - - - -	-	637,500
1,875,000	-	Total rent - £11,087,500

“ The total rent, if valued at only 18 years’ purchase, makes the value of all the houses in Great Britain 199,575,000*l.*

“ In order to form an idea of the value of cattle and farming-stock on the land, we may consider the black cattle and calves, sheep and lambs, swine, pigs, and poultry, annually consumed in London, as worth 6,000,000*l.*, which cannot be more than a seventh part of the whole consumption, amounting therefore in value to 42,000,000*l.*; but the whole number of cattle existing must be more than double the quantity brought to market; so that, including horses, asses, cows kept for milk, and oxen employed in agriculture, the whole value of the cattle cannot be less than 90,000,000*l.*

“ Taking the annual consumption of grain of all sorts at 16,000,000 quarters, which is probably below the truth, we may presume, that in general there is at least three or four months supply on hand, which, at only 35*s.* per quarter, will amount to at least 7,000,000*l.* The value of hay and straw, and all kinds of fodder, and of all implements of husbandry, cannot be less than five or six millions, and with the former sum cannot be less than 12,500,000*l.* The total value of cattle and farming-stock is therefore 102,500,000*l.*

“ The value of the shipping belonging to Great Britain may be calculated with more accuracy. It appears from the accounts laid before parliament, that, exclusive of Ireland and the plantations, the number of vessels in the merchants’ service, belonging to Great Britain, on the 30th September 1804, was 17,809; and the amount of their tonnage, 2,018,999 tons; taking it at 2,000,000, at 8*l.* per ton, it makes 16,000,000*l.*, which is certainly below the real value. The shipping of the navy may at least be estimated at 4,000,000*l.*; making with the former sum, 20,000,000*l.*; to which some addition should be made for the value of ships building in all the dock-yards, and for small craft employed on the rivers and canals.

“ The quantity of money in the country has at different times been a subject of dispute, and has never been determined with precision. It was, however, pretty well ascertained by the re-coinage in the years 1773, 1774, and 1776. The value of the light gold delivered into the bank under the different proclamations, amounted to 15,563,593*l.*; and it

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was generally admitted that somewhat more than two millions of heavy guineas remained out in circulation, which, with the silver and copper coin, made the whole at that time about 20 millions; at which sum Mr. Chalmers estimated it in the year 1786. Including the cash in the coffers of the bank it appears, that at the time of the re-coinage the whole money in the country was rather above than under the sum just stated; and from the sums annually coined since that time, it might be presumed that the quantity in circulation at present was considerably greater. Mr. Rose has stated it at no less than 44,000,000*l.*; but though our commerce has considerably increased, it will hardly be thought, considering the far greater quantity of small bank notes in circulation, that, if 20 millions of coin were sufficient in 1776 or 1786, we can at present have occasion for more than 25 millions at the utmost.

“Of the value of the merchandize and manufactures usually in the hands of the merchants, wholesale dealers, shopkeepers, and manufacturers, it is very difficult to form a satisfactory idea. The total amount of the imports in the year 1804 was 29,201,490*l.*, and of the exports 34,451,367*l.*, according to the Custom-house accounts; but it has long been known that these accounts are considerably below the true value, and particularly since passing the Convoy act, in the execution of which it has appeared that the declared value of British manufactures exported is about 71 *per cent.* greater than the value in the inspector-general's register; and, with respect to the foreign merchandize imported, the difference on the whole may not be much less; for it is certain that some of the articles are at present considerably more than 71 *per cent.* above the value at which they are rated. Taking the whole, however, as rated only 60 *per cent.* under the present values, the annual amount of foreign trade will be 101,844,571*l.*, to which some addition should be made for smuggled goods. It was the opinion of a numerous meeting of merchants in the year 1797, that there is at all times at the least two months supply of export and import merchandize in the custody of the merchants and traders, which, according to the above total, will amount to 16,974,095*l.*; to which some addition should be made for property in the hands of foreign merchants, on account of the merchants of this country generally giving longer credit than they are allowed from other countries. But though the value of goods in the hands of merchants and wholesale dealers appears so considerable, it must be exceeded by the goods in the hands of the manufacturers and of retail traders; for though many of our principal manufactures depend greatly on foreign trade, their main support is the home consumption. The official value of British produce and manufactures exported in the year 1804, was 23,935,793*l.*; but the real value, as far as it can be ascertained, amounted to 40,349,642*l.* This, it may be presumed, cannot be more than half of the whole produce of our manufactures, which will thus amount to 80,699,284*l.*, of which but a small proportion is included in the value before-mentioned in the hands of the merchants; which consists chiefly of foreign merchandize and materials for the different manufactures, as they can generally obtain manufactured goods for exportation at a short notice, deducting, however, 3,000,000*l.* on this account; of the remainder it is probable that there is much more than three months supply in the hands of the manufacturer, in different stages from the raw material to finished goods, and in the possession of retail traders, who, in many branches, are obliged to keep a large assortment; but taking it only in this proportion it amounts to 19,424,821*l.*

“There still remains to be valued that part of the property of individuals which consists in household furniture, wearing apparel, plate, jewels, and trinkets, books, provi-

sions, fuel, carriages, &c.; with respect to which the most that can be done is to form a conjecture that shall be generally admitted as not exceeding the truth; and certainly this general kind of property, of which every individual must possess or enjoy the use of some share, will not be thought over-rated at three times the yearly rent of the houses which contain it, or 33,262,500*l.* in all Great Britain.

“Having thus valued the different descriptions of stock, or actual capital, its total amount will appear as follows:

Value of the land of Great Britain	£ 828,660,000
Houses	199,575,000
Cattle, and all kinds of farming stock	102,500,000
Shipping; navy and merchant ships	20,000,000
Money	25,000,000
Goods in the hands of merchants and whole- sale dealers	16,974,000
Goods in the hands of manufacturers and retail traders	19,424,000
Furniture, apparel, &c.	33,262,000
Total	£ 1,245,395,000

“Upon this capital all other species of wealth, whether consisting in the securities of government or individuals, or of any other description, ultimately depends; for private and public loans, in which mode a great part of the property of many persons is invested, implying an obligation on the part of the borrower to repay at a future period a certain sum of money which is the measure and representative of all other species of property, or to pay an income arising from this sum till the capital is repaid, the borrower is no otherwise richer than by the greater income he can make from the money than what he agrees to pay for it; as the capital, in whatever manner he invests it, still belongs to the lender, who, though he may not, by the laws of the country, be permitted to take possession of the property into which his money had been converted, may, if necessary, bring it to sale, for the purpose of re-converting it into the sum equivalent to what he had lent. If, therefore, the whole of the land, houses, cattle, and all other articles composing the wealth of the country, was in the hands of one half of the inhabitants, who had borrowed the above sum of 1,245,395,000*l.* from the other half, it is evident that the whole real capital of the country would in fact be the property, not of those in possession of it, but of those to whom they were indebted. This is the case with respect to a considerable part of the capital part of Great Britain; and the debts of the government have greatly contributed to bring it into this state; for though these debts are not contracted under an obligation to repay the principal at any fixed period, they rest on the right which the government possesses, to claim, if it should ever be necessary, a portion of the general property sufficient for this purpose, and, till that time, to raise sufficient contributions to pay an annuity equivalent, in value, to such principal.

“The above estimate shews that, notwithstanding the expensive wars in which the country has been engaged, which, by drawing much money out of the country, has greatly diminished the profits that would otherwise have remained, there has been a great accumulation; though, at the same time, the people in general appear to live in a much more expensive manner than their ancestors. We have seen that, in the year 1664, the whole national capital did not exceed 700,000,000*l.*, according to the present value of money; there has, therefore, been an average gain since that time of nearly four millions *per annum*, a very considerable part of which must have arisen from foreign commerce; for com-

merce

merce would not be carried on without gain; and whatever profits have been saved or converted into stock, must appear in the foregoing account; even the increased value of the land and houses is in a great measure owing to the assistance of capitals acquired in trade.

“The great increase of the annual income is a further proof, that there must have been such an accumulating surplus as is here stated. Sir W. Petty computed the whole income of the country to be 42,000,000*l.*; Mr. G. King estimated it at 43,500,000*l.*; Mr. Davenant, in 1701, stated it at 49,000,000*l.* These accounts are exclusive of Scotland; but after making a sufficient addition on this account, it will appear that there has been a very considerable increase. Sir John Sinclair, in 1783, observed, that the income of the country arising from lands, commerce, and manufactures, was commonly calculated at 100,000,000*l.*, which he considered rather a low valuation; and there can be little doubt that of late years the profit derived from each of these sources has been greatly augmented.

A part of the national stock or capital produces no income; such as the money in circulation, furniture, apparel, &c.; and, on the contrary, much income arises without capital, being solely the recompence of labour. A very considerable proportion arises from capital and labour united, such as that of most farmers, merchants, and retail dealers; and the difficulty of distinguishing, in many cases, that part of the income of individuals, which is the wages of their labour, from the part which should be considered as the profits of their capital, must render every attempt to particularize the amount of the different branches of income liable to objections. The following statement is, however, presumed to be not very inaccurate:

From rent of lands	-	-	29,595,000
From rent of houses	-	-	11,087,000
Profits of farming, or the occupation of the land	-	-	6,120,000
Income of labourers in agriculture	-	-	18,000,000
Profits of mines, collieries, and inland navigation	-	-	2,000,000
Profits of shipping in the merchants' service, and small craft	-	-	1,000,000
Income of stock-holders	-	-	18,925,000
From mortgages and other money lent on private securities	-	-	2,500,000
Profits of foreign trade	-	-	11,250,000
Profits of manufactures	-	-	13,300,000
Pay of the army and navy, and seamen in the merchants' service	-	-	5,500,000
Income of the clergy of all descriptions	-	-	2,200,000
Income of the judges, and all subordinate officers of the law	-	-	1,800,000
Professors, schoolmasters, tutors, &c.	-	-	600,000
Retail traders not immediately connected with foreign trade, or any manufacture	-	-	6,000,000
Various other professions and employments	-	-	2,000,000
Male and female servants	-	-	2,000,000
		Total	£133,877,000

“Of this annual sum, the part drawn from other countries by commerce, is stated at 11,250,000*l.*, which is founded on a supposition, that the capital employed cannot be less than 75,000,000*l.*; and that the profits thereon, including those of all persons immediately depending on foreign trade, may be taken at 15 per cent. It must not however be supposed, that the nation receives an accession

of wealth to the amount of 11,250,000*l.* annually from this source: whatever payments are made to other countries for the dividends on the share foreigners hold of the public debts, or as subsidies to their governments, or spent therein in the maintenance of troops, or by British subjects occasionally resident there, operate to the diminution of this profit in a national view. The actual wealth, which the country acquires by its intercourse with other nations, may be very different from the profits of the individuals concerned in trade; as a sum equal to a great part, or even the whole, of such profits, may be sent abroad in the various ways just mentioned. The balance of trade in favour of the country has usually been estimated by the excess of the exports beyond the imports, and a comparatively small amount of the latter has been considered highly desirable. This is a concise mode of determining a very important point. But even if the Custom-house accounts were much better adapted to the purpose than they are, the justness of the conclusions thus drawn from them would be very doubtful; for it may be easily shewn that in many cases, if the imports even exceeded the exports, there might notwithstanding be a considerable gain. Thus, supposing the merchants of this country to purchase British manufactures for exportation, on their own account, to the value of 20,000,000*l.*, the net proceeds thereof in the countries to which they are exported cannot be considered as less than 22,000,000*l.*; and this sum being invested in foreign produce, and imported into this country, will amount, after repaying the duties and all expences, to at least 24,200,000*l.*, returning the merchants the capital originally advanced, with a profit of 21 per cent. In like manner, whenever the merchandize imported in return for any quantity exported is of greater actual value in this country, or yields a greater price, after allowing for all charges and the interest of the capital employed, the surplus must be an addition to the wealth of the country; and if the whole of the foreign trade was of this description, the excess of the imports would shew the profit or the wealth acquired by the exchange of commodities with other nations.

“It has been shewn, that the total income of the country is at present upwards of 133,000,000*l.*; and that it cannot be less than this sum, may be inferred from the general expenditure. Sir W. Petty reckoned the average expence of men, women, and children, in England and Wales, at 6*l.* 13*s.* 4*d.* per annum, for food, housing, clothes, and all other necessaries; Dr. Davenant took the average expence at 7*l.*, which, according to the difference in the value of money, is equal to upwards of 16*l.* for each person at present. Mr. Jonas Hanway, about 35 years ago, estimated the expence of the people of England and Wales on an average about 9*l.* each; but this must be too low at present: and the following estimate will probably approach nearer to the truth, with respect to the mere expence of subsistence, or of eating and drinking, particularly as we are not to consider what is absolutely necessary for support, but what is actually expended in this way:

300,000 persons at 16 <i>d.</i> per day	£	7,300,000
700,000 — 12 <i>d.</i> —		12,775,000
1,500,000 — 9 <i>d.</i> —		20,531,250
2,000,000 — 6 <i>d.</i> —		18,250,000
2,500,000 — 4 <i>d.</i> —		15,208,333
2,000,000 — 2 <i>d.</i> —		6,083,333
1,500,000 — 1 <i>d.</i> —		2,281,249
		£82,429,165

“When

POLITICAL ECONOMY.

“When the price of most of the necessaries of life is considered, it will not be thought that the expence of subsistence is over-rated in the lowest classes; and if this is admitted, it cannot be too high in the other classes, when it includes strong beer, spirits, wine, and a variety of luxuries. To the expences of living must be added, those of house-rent, clothing, and superfluous expences, in order to arrive at the whole actual expenditure. The first of these articles has been stated at 11,087,500*l.*; and allowing for the rent of shops, warehouses, and other buildings appropriated wholly to trade, it may be taken at 9,500,000*l.* The expence of clothing, including every article of dresses, or personal decoration, will, on a very moderate computation, amount to 26 millions, *viz.*

150,000 persons at	20 <i>l.</i>	per annum		3,000,000
300,000	—	12 <i>l.</i>	—	3,600,000
750,000	—	8 <i>l.</i>	—	6,000,000
1,300,000	—	4 <i>l.</i>	—	5,200,000
2,800,000	—	30 <i>s.</i>	—	4,200,000
4,000,000	—	20 <i>s.</i>	—	4,000,000
1,500,000	—	0		
<hr/>				
10,800,000				£26,000,000
<hr/>				

“With respect to superfluous expences, when the sums spent by the nobility and people of fashion in plays, operas, concerts, routs, gambling, horses, carriages, and other amusements and luxuries, are considered, it will certainly be thought a very moderate assumption, that, including what is spent by others on objects more rational, though not absolutely requisite, there is half a million of persons who, one with another, spend 25*l.* per annum in unnecessary expences, making 12,500,000*l.* The total expence will then be:

For subsistence	-	-		82,400,000
For house-rent	-	-		9,500,000
For clothing	-	-		26,000,000
For miscellaneous expences	-	-		12,500,000
<hr/>				
Total				130,400,00
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“The difference between this expenditure and the general income, shews the annual gain of the country, or the sum applicable to the extension of commerce, the reservation of a greater quantity of foreign articles, the increase of shipping and buildings, agricultural or mechanical improvements, or other augmentations of the general stock. Without such a surplus, few improvements could be carried on, nor could there be any increase of wealth; and if this latter circumstance is thought essential to national advancement, it becomes an object of much importance, that the expences of the government should be restrained within such bounds, and provided for in such manner, as to intrench as little as possible on the annual surplus that would otherwise be converted into permanent capital.”

With regard to the influence of money and credit upon the circulation of the produce of labour, we refer the reader to our articles MONEY, PAPER Currency, BANK, and CREDIT. For various other topics connected with this interesting and important subject, the reader may examine different other articles in the course of our volumes, particularly EXCHANGES, PAR of Exchange, COLONIES, COMMERCE, and CORPORATIONS.

We shall conclude the article with some account of the various systems concerning national income and consumption. All systems of political economy agree in making national income to consist in the produce of annual labour. The sponta-

neous productions of the soil, of mines, and the waters, are not very considerable, and moreover require a certain portion of labour to be brought to market. Income is either private or public. The produce of general labour, whether in the hands of individuals, where it forms private income, or diffused all over the country in the shape of national income, is partly consumed by the producer, and partly exchanged with the view of consumption. If the produce consumed in the place where it was produced be abundant, its plenty contributes alike to public and private wealth; but if that produce be rare, its scarcity impoverishes the individual and the public. With regard to the produce exchanged by the producers, if the exchange takes place with a foreign country, its abundance turns it to the benefit of the foreigners, who purchase it with the same values which they used to give for it, unless the foreign country should have been favoured with a like abundance in its own produce; because in that case plenty is equally beneficial to the foreigners and natives, and in both cases private and public wealth remains the same. But if the produce exchanged with the foreign country be scarce, the foreigners are sufferers by this scarcity. Finally, if the exchange of national produce take place at home, its plenty becomes beneficial to the consumers, without loss to the producers, because the latter always receive the same value which they usually received from the consumers. But in case of scarcity, the loss is to the consumer, yet without any benefit to the producer, because the consumer can only give him the usual value: therefore in both cases there is neither loss nor profit for private and public wealth. But when the abundance or scarcity is excessive and extraordinary, it is more or less fatal to the producer or consumer, still without effecting any difference between public and private wealth, because what the one loses the other gains: and public wealth, which consists of individual riches, experiences no change from the loss of the producers and the gain of the consumers. It seems to be of great importance that governments should be fully convinced of the identity of public and private wealth, because it is on this truth that the maintenance of social order, the progress of public wealth, and the melioration of mankind do, in a measure, depend.

The produce of annual labour, whether considered as private or national income, is distributed in the shape of wages, of labour, profit of stock, or rent of land, and the distribution is regulated by the progressive, stationary, or retrograde state of national wealth. When wealth is progressive, more produce of the annual labour is distributed in wages of labour, profit of stock, and rent of land: when it is stationary, a smaller quantity of that produce goes to the labourers as wages, and to the landholders as rent; and the profit of stock remains as before; but when it is retrograde, the wages of labour sink so low, that they are scarcely adequate to supply the most urgent wants of the labourers; rents also suffer a considerable diminution, but the profits of stock experience a rise corresponding with the decline of national wealth.

Consumption bears a necessary and indispensable proportion to the national income, but that proportion has not yet been invariably fixed. The French economists think that consumption ought to be equal to the income, and they allow no economy but in that part of the annual income reserved for the land owners as the net produce of their lands. But according to Dr. Smith, consumption ought to be inferior to income, and it is on the surplus of income that he chiefly founds the progress of national wealth: and he assumes that parsimony and not industry is the immediate cause of the increase of capital. There are some authors who condemn economy;

economy; who regard consumption as the measure of re-production; and maintain that the people are the richer the more they spend, whence luxury would become the most powerful spring of wealth. When an individual consumes more than his income, the surplus must be taken from his capital, which is gradually diminishing, and the diminution of the capital diminishes his income in the same proportion: and if he go on upon this plan, the time will come when that individual, having neither income nor capital left, is obliged to labour for his subsistence, or to be indebted for his maintenance to public charity. What is true of one individual is equally so of several, and even of a whole nation, and the excess of consumption above income may therefore occasion the ruin of nations as it does the misery of individuals. It was so understood among the ancients, who not only recommended economy, but honoured parsimony very highly, and imputed to luxury the decay of morals, the ruin of private fortunes, and the loss of the state. A distinction ought, however, to be made between individuals and the state; for though the expenditure of individuals should absorb their income, it may, so far from being prejudicial to national wealth, even contribute to its increase. The desire of comforts, the love of pleasure, &c. are powerful incitements to labour, and induce the labourer to multiply the produce of his labour; and in that case he labours more in proportion as he consumes more, and he becomes richer as his expences are more considerable. In this particular instance those are right who praise luxury and attribute to it a large share in the increase of wealth, and also in the civilization of individuals and nations; but neither individuals nor nations can enjoy a solid and permanent prosperity, unless when private and public consumption does not absorb the general income, and when the surplus produce, that is annually accumulated, goes to augment the sum of labour, raise the wages of labourers, increase population, develope industry, multiply wealth, and place public power on the immoveable basis of population and wealth.

We may farther observe, that after the produce of the annual labour of every country has been reduced to its true value by its interchange with the produce of all countries, it has no longer any influence upon wealth, but with regard to its distribution and consumption. The national produce is distributed to the *land owners* in the shape of *rents*; to the *capitalists* as *profits of stock*; and to all who participate directly or indirectly in *labour*, in the shape of *wages*. This distribution is more or less favourable to the progress of public and private wealth, according as stipulations in all private contracts are more or less free. All measures that alter the direction of this distribution, and infringe upon its natural proportions, oppose more or less obstacles to wealth, and may even prove fatal to its existence. Independently of the distribution of the produce of labour to the land owners, the capitalists, and the labourers, a part must be taken from this produce for government and the servants of the state, which also has a considerable influence upon wealth. The consumption of the produce allotted to each individual, by the rents of land, the profits of stock, and the wages of labour, is subject to two laws: 1. The consumption of the annual produce must be inferior to the total quantity of that produce. A part should be saved for the increase of the capital stock; for unforeseen wants; and a progressive population. This economy acts as a safe-guard against the blasts of fortune, and is a certain pledge of grandeur and prosperity: and so long as the consumption of public and private revenue does not absorb the whole produce of general labour, wealth is progressive, nations prosper, and are, in truth, advancing to the highest degree of power and splendour.

2. Consumption is more or less useful to the progress of wealth, according as it is or is not directed to solid and lasting enjoyments.

To conclude in the words of Mr. Ganilh: "In the economical system of modern nations, general labour is the spring of wealth, and general economy the only way of increasing the funds and the resources of labour; of developing its power, its faculties, and its genius; and of giving it a constant and unlimited progression. The general interchange of the produce of labour, by affording to the labouring classes new, varied, and inexhaustible enjoyments, stimulates their activity, excites their industry, encourages their efforts, and raises them to the highest degree of energy and industry, and the extent of a more or less beneficial consumption of the whole productions extends or narrows the bounds of wealth and opulence.

"Wealth, in the modern system of political economy, is the work of all men, of all nations, and, as it were, of the whole human race; the reward of all individual efforts; and the end of private and general ambition. When all are rushing to the same end, the rights of all are respected, the interests of all attended to, and the conveniences of all consulted. All advance by the side of each without elbowing, without injuring, without crushing each other. All are benefited by their reciprocal efforts, and all owe their successes to their general co-operation. To this admirable system, civilization is indebted for its progress; and when better understood, it will prove its most vigilant safe-guard and its firmest support."

POLITICAL Criticism. See CRITICISM.

POLITICAL Liberty. See LIBERTY.

POLITICAL Power, in *Matters of Government*, is, according to Mr. Locke (*Of Government*, b. ii. c. 1. § 3.) a right of making laws with penalties of death, and consequently all less penalties, for the regulation and preservation of property; and of employing the force of the community in the execution of such laws, and in the defence of the commonwealth, from foreign injury; and all this only for the public good. The principle upon which this kind of power is founded, is this, that it is every person's interest to give up his own judgment as to his property and his right of self-defence to the regulations of laws and magistrates; since in this way the preservation of property and the safety of every person are best consulted. Reason teaches all the members of society, to submit the strength of the whole to the direction of proper persons, to be by them exerted in its defence. Thus the reason of the thing, the consent of the several members, express or tacit, and the authority of the Creator, obliging to what is for the common good, concur to establish political power, and to make submission to it a duty.

POLITICS, POLITICE, πολιτικη, from πολις, *civitas*, *state*, the first part of economy, or ethics, consisting of the governing and regulating of states, for the maintenance of the public safety, order, tranquillity, and good morals.

Lord Bacon divides politics into three parts, with regard to the three grand ends thereof, or the three offices incumbent on those who have the administration; *viz.* the *preservation* of the state; the *happiness* and *flourishing* of the state; and the *enlargement* of its bounds.

The two first parts, he observes, are well handled by several authors; but about the third there is a deep silence. He ranks this, therefore, among the number of the desiderata, and gives us a specimen of an essay to supply it.

We have several systems of politics by Aristotle, Machiavel, Doria, Lipsius, &c. in which last there is nothing but

particles and conjunctions of the author's own; the body of the book being all quotations.

POLITICS, *Academy of*. See ACADEMY.

POLITIUM, in *Ancient Geography*, a town of Italy, belonging to the Marrucini. Diod. Sic.

POLITTOOR, in *Geography*, a town of Hindooftan, in the Carnatic; seven miles N. of Conjeveram.

POLITORIUM, in *Ancient Geography*, a town of Italy, in Latium, and in the first region of it, according to Pliny. Livy says, that it was taken by king Ancus.

POLITSCHANO, in *Geography*, a town of the duchy of Stiria; four miles S. of Windisch Weiftritz.

POLITY, or POLICY. See POLICY.

POLITZ, in *Geography*, a town of Anterior Pomerania, near the Frisch Haff, celebrated for its hops; eight miles N. of Old Stettin. N. lat. $53^{\circ} 36'$. E. long. $14^{\circ} 40'$.—Also, a town of Bohemia, in the circle of Konigingratz; four miles W. of Branau.

POLITZKA, a town of Bohemia, in the circle of Chrudim; 20 miles S.E. of Chrudim. N. lat. $49^{\circ} 40'$. E. long. 16° .

POLIUM, in *Botany*, from *πολιος*, hoary, an old name for a pretty mountain plant, of which there are many varieties, or perhaps species, comprehended by Linnæus under his *Teucrium Polium*. The heads of flowers are hoary, and the backs of the leaves snow-white. The whole herb is bitter and strongly aromatic, esteemed useful for keeping away moths from clothes and furniture, whence it has sometimes obtained the appellation of *Tinearia*. See TEUCRIUM.

POLIVO, or BURNT Island, in *Geography*, an island of the Archipelago, which lies to the E. of Argentiera, and is separated from it only by a channel a quarter of a league wide. It formerly belonged to individuals of Milo and Argentiera, who had flocks on this island; but fearing to turn it to account lest they should attract the attention and extortions of the Turks, they were endeavouring to dispose of their interest in it, when Sonnini visited it. This island, occupied only by flocks, is four or five leagues in circumference, and, about one-fourth of the soil excepted, capable of cultivation. The uncultivable part consists of hills, partly covered by rocks, between which grow various plants and shrubs; and these hills, though not cultivated, would not be unproductive; flocks would find there abundance of food; and lentisks and junipers would yield wood and oil. Nature has planted between the rocks bulbs of saffron, in the midst of other vegetable productions, useful, though wild. In the bosom of the rocks are found carnellians of several colours, but mostly of a yellow-orange colour, and agates of a yellow and transparent grey, which may be considered as a species of fardonix. An excavation, supported by posts, indicates ancient mineralogical labours, and it might be possible to renew them with advantage. To the culture of various species of corn, cotton, &c. and to the collection of wood, might be added the rearing of bees, and wax in the Levant is known to be a profitable article of trade. The situation of Polivo at the entrance of the Archipelago, in the vicinity of a great number of islands, forming a road, the common anchoring place for vessels that navigate in these seas, would give birth to an infinite number of commercial speculations, which could not fail to be very productive. On the west, facing Argentiera, are two coves, into one of which ships can enter. The Europeans call Polivo by the name of "Burnt Island," because the Venetians, during the long wars which they had to maintain against the Turks, destroyed by fire the olive trees with which it was covered. These trees indicate the goodness of the soil, and the small number, still

cultivated on the west coast, opposite to Argentiera, produces abundant crops.

POLIZZI, a town of Sicily, in the valley of Mazara; 15 miles E. of Cefalu. N. lat. $37^{\circ} 47'$. E. long. $14^{\circ} 10'$.

POLKOWITZ, a town of Silesia, in the principality of Glogau, containing two churches; 10 miles S. of Gros Glogau. N. lat. $51^{\circ} 29'$. E. long. $16^{\circ} 5'$.

POLL, a term used in ancient writings for the head.

The word is, doubtless, formed from *pole*; this part being, as it were, the pole of the microcosm.

Hence, to poll is to enter down the names of persons who give their votes, or voices, at an election.

POLL Deed. See DEED.

POLL-Evil, in *Veterinary Science*, a name given to an abscess formed near the head of a horse, about the junction of the first vertebra of the neck. It commonly proceeds either from a blow or hurt received on the head, either by striking it against the ceiling of a low stable, or by the pressure of old harsh harness halters. Upon the first discovery of it repellents may be used, such as fomentation with hot vinegar and a sponge, followed by a slight application of camphorated spirits. The most effectual method, it is said, of dispersing the tumour in the first stage of the disorder, is that of anointing the inflamed parts with blistering liniment. But for expediting suppuration, the best applications are hot fomentations with gruel, succeeded by emollient poultices of linseed powder, milk, and a small quantity of turpentine well incorporated, or bread, milk, and white lily-root, bruised to a paste and applied of a proper warmth. When suppuration has taken place, and the matter can be distinctly felt, an opening must be made as near as possible to the inferior part of the abscess, and a seton be introduced through the whole extent of the cavity which should be frequently moved, and washed with spirits of turpentine. The healing process may be aided by daily injecting the following lotion into the cavity of the abscess: *viz.*

Take muriated quicksilver and vitriolated copper, of each in powder two drachms, and of boiling water, one pint; when cold, add two ounces of tincture of myrrh, and mix them.

If sinuses be formed, and the lotion be not sufficient to heal the parts, the parts must be laid open by an incision through their whole extent, and the following dressing may be used: *viz.*

Take of red precipitate, in powder, half an ounce, ointment of yellow resin, two ounces, and oil of turpentine, half an ounce, and mix them.

Over this dressing lay a large pledgit of tow, spread with any simple ointment. In the further process, let the wound be kept clean, and the treatment be such as is usual in simple wounds.

POLL Taxes. See CAPITATION.

POLLS, *Challenge to the*. See CHALLENGE.

POLLA, in *Geography*, a town of the duchy of Stiria; six miles W.N.W. of Hardeberg.—Also, a town of Naples, in Principato Citra; four miles S. of Cangiano.

POLLACK, in *Ichthyology*, a name which we give to two different fish of the *afellus* or *gadus* kind, with the different epithets of *raw* and *whiting*. The raw-pollack is the same species that in some parts of England is called the cole-fish, and is the *afellus niger*, or *gadus carbonarius*, of authors. The other is called the whiting-pollack, and is the *afellus virefcens* of Willughby and others; and the *gadus pollachius* of Linnæus. See GADUS.

The whiting-pollack is common on many of our rocky coasts, and numbers of them are seen in summer sporting on the surface of the water, which are often taken with a

goose's feather fixed on the hook. They do not grow to a large size, and are a good fish for the table.

POLLAJUOLO, ANTONIO and PIETRO, in *Biography*. These brothers were born at Florence of low parentage, Antonio in 1426, and Pietro in 1428; and as their father was unable to give them a liberal education, Antonio was placed with Bartoluccio Ghiberti, a very eminent goldsmith, and Pietro became a disciple of Andrea del Castagno. Antonio followed his trade with the highest credit, and designed extremely well in metals, and in wax; having performed many very estimable works in both. But as Pietro had at the same time rendered himself considerable, and was in great reputation for his performances in oil-colours, Antonio quitted his original profession to learn design and colouring from his brother; and they ever after associated in all those works which they executed in Florence, and several other cities in Italy.

Pietro had been taught the secret of preparing his colours with oil, by his master Castagno; and having communicated that knowledge to Antonio, these artists improved it daily by their practice, and distinguished themselves exceedingly for portrait painting, as well as for history. Pietro in particular painted the portraits of Poggio, who wrote the history of Florence, and of many of the nobility, in a size as large as life, which procured him the greatest applause. Among the historical subjects which they jointly executed, are mentioned some of the Labours of Hercules, painted in the Medicean palace; and in the chapel of the family Pucci, à Servi, there yet exists a picture, by the hand of Antonio, of the Martyrdom of St. Sebastian, one of the best performances of the fifteenth century, if not in colour, superior in composition to the productions of that epoch.

These brothers lived in high esteem and great affluence; and they died in the same year, not more rich in fortune than in reputation. Few months intervened between the death of the one and the other; and they were both buried in the same tomb, in the church of St. Pietro in Vincula, at Rome. Fufeli's Pilkington.

POLLAM, in *Commerce*, a weight at Madras, and other parts of the East Indies; 320 of which are equal to 3200 pagodas = 8 vis = 1 maund.

POLLARD, among *Hunters*, a stag, or male deer, which has cast its horns.

POLLARD, in *Planting*, a term applied to a tree that has been frequently polled or lopped, and its top taken off, or headed down to the stem, for the purpose of fire wood, or small poles for hurdle wood, and other similar uses, as well as for hop poles, &c. It is a term most commonly in use in the southern and eastern districts of the kingdom. But though much wood of this small sort may be provided in this way, the practice has been highly reprobated, not only as being destructive of good timber, but as a barbarous system which disfigures and renders the appearance of the country disagreeable.

In the Survey of Middlesex, after remarking that the hedge rows in that county are sometimes disfigured by pollard trees; but in no degree equal to what they are in some other counties; it is observed, that hedge rows in no district are so barbarously used by the tenants, or reflect so much want of attention on the part of the landlords, as those in Norfolk and Suffolk. Numerous are the fields in those counties whose hedges are filled with pollards of every age, under perhaps two hundred years, of no value to the tenant, and worth to the landlord only a twentieth, or thirtieth part of what those identical trees would have been worth, had they been protected from the spoliation of the farmer's axe. Including interest on the value of such trees, the

amount would have been at least an hundred times more than it is.

And instances are not wanting in every county, of pollard oaks abounding in hedge rows; which, had they been protected till grown into trees, and sold in their prime, including interest on their produce, would now have brought three times more money than the freehold would sell for which produced them. But, for want of such protection, they at present disfigure the estates on which they stand; and are only of a comparatively trifling value. Consequently, the owners of such estates have lost the greater part of their property by the knavery of their tenants; the want of skill and diligence in their agents; and of attention or discernment in themselves. It is suggested, that the best remedy for this evil would be, for landlords to cut down all the pollards over the whole extent of their properties; and to sell them for what they would fetch. They would produce, on some estates, a considerable sum, which, at compound interest, would double itself every fifteen years. But the longer the pollards stand, the less valuable they will be. In the next place, a covenant should, it is contended, be entered into by the tenant, not to *top* any tree (nor to *lop* it to any greater height than ten or fifteen feet from the ground) under a penalty of five pounds for each offence; which sum the landlord would be entitled to receive of the tenant for every pollard discoverable at any time upon his estate. Any tree recently pollarded, would be positive evidence against the tenant; who should be invariably required to pay the penalty; and, when that is done, the landlord should cut the pollard down. If this method were adopted, and the young trees thus carefully protected, the estates would increase in beauty and value every year. In a *national* point of view, this matter is of still greater importance, as it is not conceivable, without the help of calculation, what an immense loss of timber is sustained in this way.

Where pollard trees abound in hedge rows, they are in general cropped or cut over once in from about nine to fifteen years, the advantage of which mostly belongs to tenants. It is a work that should be carefully performed, the branches being taken off by a clean cut, and be constantly finished by the latter part of February, if possible to be done.

POLLARD, in *Rural Economy*, a term applied to the fine bran or inner husk of wheat. It is a substance much used in the southern districts in feeding hogs and different sorts of domestic animals.

POLLARD is a name given by some historians to a sort of base money current at one time in Ireland, and called more usually *crocards*.

These were coins of France, and other nations, which passed in Ireland as pennies, though really not worth quite half so much. They were made of copper, with a very small admixture of silver.

It was in the reign Edward I. appointed lord of that kingdom in the life-time of his father Henry III. that the use of false and counterfeit money of this kind was so extremely common in Ireland. While his father reigned in England this prince never extended his power so far as to set up any mint, or coin any money in Ireland; but at his accession to the crown he found his treasury empty, and the current coin of his kingdoms in a very bad condition; his absence of near two years after his father's death having so encouraged the clippers and coiners of money, that little but clipped or counterfeit money of the kingdom was to be met with; and five or six different sorts of base and mixed money had been imported privately, and uttered in England and Ireland as pennies, though they were not half the value of the penny sterling.

These were the crocards and pollards, called also mitres, lionines, rosaries, and by the like names, according to the things marked in the impressions. To remedy this evil, and restore the current coin of the kingdom to its ancient purity and value, this prince established a certain standard; and as the base money was an admixture of a very small quantity of silver, with a great deal of copper, he ordered that there should be in every pound of money weighing twelve ounces, eleven ounces and two penny-weights and a quarter of pure silver, and only seventeen pence halfpenny farthing alloy.

The said pound to weigh twenty shillings and three pence in account; the ounce twenty pence; and the penny twenty-four grains and a half. According to this regulation, the money of Ireland was also ordered to be made, and a new kind of money was struck there in the year 1279, under Stephen de Fulbourn, bishop of Waterford, and lord deputy of Ireland. The pieces coined at this time in Ireland were groats, or four-pennies, halfpence, and farthings; and as these were the same in value, as to weight, with the English coins, they would go equally in England and Ireland; and in the twenty-ninth year of the reign of the same prince, that is, in 1300, the crocards, pollards, and other base money, were decried; and it was made death, with confiscation of goods, to import any of them.

By this means the circulation of the base and mixed money was in a great measure stopped, and four new furnaces were erected in the mint of Dublin, to supply the great demand that there was for good money; and Almander Norman de Line was appointed master of the coiners. This was the beginning of good money in Ireland; and in the year 1304, there were sent over from England twenty-four stamps for coining of money there, *viz.* three piles with six crosses, for pennies; three piles with six crosses, for halfpence; and two piles with four crosses, for farthings. In the old way of coining with the hammer, before the mill and screw were invented; two kinds of punchions were in use, the one called the cross, upon which was engraved the head of the prince; and this was so called, because anciently a cross was the figure struck on this side of coins instead of the head of the prince: the other, called the pile, contained the arms, or some other figure, to be struck with an inscription on the back, or reverse of the coins. The pennies and halfpence struck in this king's reign, have the king's head in a triangle full-faced. The best preserved of them, found at this time, weigh twenty-two grains the penny: and the halfpence from ten grains to ten and a half. The farthings are so scarce, that it is very rare to meet with one in the collections of the most curious. Simon's Hist. of Irish Coins, p. 15.

POLLARD, in *Ichthyology*, a local name for the young and small fish of the cole-fish, or rawling-pollack kind. It is used in Cornwall, &c.

POLLAROLI, CARLO FRANCESCO, in *Biography*, one of the most voluminous composers of operas at Venice; who, from 1689 to 1729, when he died, composed more than a hundred lyric dramas for that city, which seem all to have been well received. His son Antonio, maestro di cappella of St. Mark's cathedral, was an eminent musician, and a composer of several operas for the Venetian theatres.

POLLAY, in *Geography*, a town of Hindoostan, in Bahar; 25 miles S.W. of Patna. N. lat. 25° 21'. E. long. 85°.—Also, a town of Hindoostan, in the circar of Ruttunpour; 10 miles N.E. of Ruttunpour.

POLLE, a town of Westphalia, in the principality of Calenberg, on the Weser, with a ferry; 20 miles S. of Hameln.

POLLEAR, or POLEYAR, in *Hindoo Mythology*, a name of the god of prudence and policy. He is always represented with the head of an elephant, and generally with four arms, otherwise as a man; sometimes mounted on a rat or mouse, or with that animal beside him, it being deemed in India a very sagacious animal, and the elephant proverbially so. He is deemed the offspring of Siva and Parvati, and is often seen with the sectarial marks on his forehead, that distinguish the grand division of Saivas; such as horizontal lines, a crescent, &c. His commonest name is Ganefa; that at the head of this article being of local usage, on the coast of Coromandel chiefly. He is also classically called Ganyaka; and vulgarly, among the Mah-rattas and low people, Ganpatty. His name of Ganefa is derived by sir W. Jones from *gana*, an assemblage of gods, and *isa*, meaning lord; denoting him to be the superior of such assemblages, of which Hindoo books enumerate nine, each consisting of eight deities. He is invoked by Hindoos of many, if not of all, sects in the outset of any business: if a person build a house, an image of Ganefa is previously propitiated by ceremonies detailed in their rituals, and set up at or near the spot: if he write a book, Ganefa is saluted at the commencement, as he is also at the top of a letter, with *Sri Ganefa namah*, praise to the divine Ganefa, or some such phrase, or a character denoting it. Setting off on a journey, Ganefa is implored to protect him; and for the accommodation of travellers his image is frequently seen by the road side, especially where two roads cross; but sometimes it is little else than a stone rudely chiselled into something of a conical form, or like an elephant's head, with oil and red ochre daubed over it, decorated perhaps with a chaplet of flowers by some pious neighbour or traveller. It is common to see a figure of the god of prudence over bankers' and other shops; and upon the whole there is perhaps no deity in the Hindoo Pantheon, as copious as that of Rome, oftener seen and addressed.

There are several coincidences in the characters of Ganefa and Janus: to both were ascribed a character of wisdom; and when he is described as considered by the Romans "the god who presided over the beginning of all undertakings, receiving the first libations of wine and wheat, and the preface of all prayer," the description answers to both.

Besides the usual adoration paid to Ganefa associated with other gods, there is, it is said, a sect of people who exclusively or chiefly worship him. They are called Ganapatya. He has been frequently incarnated, and Hindoo books contain numerous legends of his metamorphoses and adventures, heroic and amorous. Under the article MURABA of this work, an instance is given of existing superstition connected with this deity, scarcely to be paralleled out of Asia.

The worship of Ganefa we may conclude to have been long as well as extensively a usage, for he is seen frequently sculptured in the Elephanta and other ancient caves. In the Puranas are many extravagant relations respecting him. Although usually considered as the offspring of Siva, it is said in the Siva Purana that he was formed by Parvati of fair proportions, of the excrementitious particles and impurities of her own body, without the intervention of her lord, which so enraged him, that on one occasion he cut off the head of Ganefa, in place of which an elephant's was substituted. Sometimes he is seen in pictures with but one husk, and legends, similarly extravagant, are given to account for this. Such of our readers as desire more of these fables, we refer to the Hindoo Pantheon, where many particulars and plates of Ganefa are given. Under the article PARASU RAMA of this work, that hero is mentioned as the *cutter-off* of the head of Ganefa.

POLLEE, in *Geography*, a town of Hindoostan, in Orissa; 12 miles E. of Sonepour.

POLLEN, in *Botany* and *Vegetable Physiology*, a Latin word, expressive of any fine powder, but originally of the light volatile dust of a mill; and now technically applied to the powdery particles, discharged by the anthers of flowers. These are thrown out, chiefly in warm dry weather, when the anther bursts, either by the contraction of its coat, or by some appropriate opening, or pore. The pollen, though a fine powder in appearance, and light enough to be wafted along by the air, has a peculiar and appropriate structure, sometimes very different in different plants. Each grain is commonly a membranous bag, round or angular, rough or smooth, which remains entire till it meets with any moisture, when it bursts with great force, discharging a most subtile vapour. The moisture naturally destined to produce this explosion, is the honey-like exudation of the stigma, by which means it takes place in the only situation where the requisite purpose can be answered, of impregnating the germen. (See *FECUNDATION of Plants*.) If the pollen meets with wet before it arrives at the stigma, a premature bursting, and loss of its contents and virtues, are the consequences. Nothing can be a more exquisite hygrometer than the membranous part of the pollen. This appears by the intelligent remarks of Mr. Luke Howard, of Plaistow in Essex, published in *Transf. of Linn. Soc.* v. 6. 65. To that gentleman we are indebted for the information that the pollen of the Hazel-nut, and some other plants, consists of several cells. The various movements which he describes, in pollen floating in mixtures of spirits and water, are probably to be attributed, not to any sort of irritability, but to the impetus given to each bag by the discharge of its contents; as well as to the compound agitation, caused by the hygrometrical effect of the water absorbed by the membrane, and the dissolving or separating action of the spirits upon its substance, which, from the inflammability of some kinds of pollen, appears to partake of a resinous nature.

In many plants of the natural orders of *Orchidea* and *Consortia*, as well as in the genus *Mirabilis*, the pollen seems of a glutinous nature, or rather of an elastic or spongy texture, saturated with a fluid. This fluid appears nevertheless to be analogous to the more elastic impregnating vapour of ordinary pollen. In some of the *Orchidea* it becomes, after a while, as Mr. Brown has observed, of a waxy nature. Such pollen is gradual in performing its office, attaching itself to the stigma, and remaining there in its original mass, not flying in dispersed particles, and in a casual manner, through the air, to impregnate stigmas of distant flowers.

The pollen of plants that blossom under water must be of a very different nature from that which flies through the air, and which with the touch of any moisture is destroyed. We can easily conceive that submersed vegetables may be provided with a still more glutinous, or resinous, pollen, only so far soluble in water as may answer the purpose of its communication with the stigmas; while, in like manner, the secretion of the latter must be of a different nature from that of ordinary plants, lest it should be weakened, or washed away, by the circumambient fluid.

POLLEN, in *Agriculture*, a provincial word applied to the hen-roost. It is sometimes written pollen and hen-pollen.

POLLEN *Thuris*, in the *Materia Medica*, a term used by the Latin writers to express the *manna thuris*, or *manna libanotis*, of the Greeks, but that very improperly; for the word *pollen thuris* properly signifies the frankincense reduced to a powder; but this was not what the ancient Greeks called *manna thuris*, but the small fragments which were

broken off from the large pieces, in the gathering or packing up. See *LEPTOS Libanotis* and *FRANKINCENSE*.

POLLENECA, POLENZA, in *Ancient Geography*, a town of Italy, in Etruria, N. of Augusta Vagiennorum, at the confluence of the Stura and the Tanarus. Suetonius, in his life of Tiberius, mentions it as an ancient and municipal city.

POLLENFELD, in *Geography*, a town of Bavaria, in the principality of Aichtatt; 3 miles N.E. of Aichtatt.

POLLENTIA, in *Ancient Geography*, a town of Italy, in the interior of Liguria; situated, according to Pliny, near the Alps, furnamed Potentia, and S.E. of Afta.—Also, a town of Italy, in the Picenum, with the title of a Roman colony, according to Livy.—Also, one of the chief towns of the Greater Balearic isle, situated towards the N.E., and bearing, as Strabo says, the title of a Roman colony.

POLLENZA, or PUGLIANZA, in *Geography*, a town situated on the N. of the island of Majorca, anciently *Pollentia*. This ancient little town was built, as it is said, with a view of replacing a Roman colony, founded in that situation, and on that account called Colonia. It evidently appears by aqueducts and other remains to have been formerly of greater extent than it is at present: it is a league from the sea, in a plain protected from the north winds by several high hills. The interior is well built, and the population amounts to nearly 6000 inhabitants, who are in easy circumstances. The parish church is consecrated to our Lady of the Angels, and is built in a good style of architecture; it has a prior and 19 beneficiaries, appointed by the order of Malta, who have the same jurisdiction with that formerly exercised by the Knights Templars, to whom it belonged. Here are a convent of Dominicans, an unfinished monastery of Jesuits, a military hospital, and two chapels or oratories. The moorings in the port of Pollenza are of sufficient depth to admit ships and galleys; they are sheltered from all winds, and defended by a tower with artillery. The environs are well cultivated; here are vines, olive-trees, and large flocks of sheep: the principal productions are oil and wine; the latter, called "Montona," is exquisite, and particularly valued. Near Pollenza stands an insulated mountain, on the top of which is a chapel consecrated to the Holy Virgin; and on the N. are the ruins of the castle of Pollenza. Towards the N.E. the isle is terminated by a point advancing very far out into the sea, and forming the cape of Fromentor. To the N.W. is *Palamera*, which see. After traversing some lofty mountains, thought to be the highest in the island, on the W. of Pollenza, you arrive at Soller, a small port, with a narrow and difficult mouth, protected by a battery of several guns, at which the ships receive their cargoes of oranges, which they export to foreign countries. Pollenza is distant 26 miles N.N.E. from Majorca. N. lat. 39° 51'. E. long. 3° 1'.

POLLEX, in *Anatomy*, the thumb. Pollex pedis is used for the great toe; but the expression is incorrect, since that member cannot be moved in opposition to the other toes, as the thumb may in opposition to the fingers. The proper word is hallux. See *EXTREMITIES*.

POLLIA, in *Botany*, so named by Thunberg, after his great patron I. van der Poll, a burgomaster of Amsterdam, one of those who promoted his voyage to Japan; as appears by the preface to his *Flora* of that country, p. 13.—Thunb. *Nov. Gen.* 11. *Jap.* 8. Schreb. 223. Murray in *Linn. Syst. Veg.* ed. 14. 332. Willd. *Sp. Pl.* v. 2. 149. Juss. 45.—Class and order, *Hexandria Monogynia*. Nat. Ord. *Enfatae*, Linn. *Junci*, Juss.

Gen.

Gen. Ch. reformed. *Cal.* Perianth of three obovate, obtuse, concave, coriaceous, permanent, finally reflexed leaves. *Cor.* Petals three, alternate with the calyx and about the same length, oblong, membranous, ribbed, withering. *Stam.* Filaments six, inserted into the receptacle, capillary, incurved at the summit; anthers of two roundish lobes. *Pist.* Germen superior, globose, sessile; style slender-awlshaped, incurved; stigma simple, obtuse. *Peric.* Berry globose, coloured, polished, accompanied by the reflexed calyx and withered petals. *Seeds* numerous, about twenty, angular.

Ess. Ch. Calyx of three leaves. Petals three. Filaments simple. Berry with many seeds.

1. *P. japonica*. Thunb. Jap. 138. Jamma Mioga of the Japanese.—The only known species, found near Nagasaki in Japan, as well as in the isle of Java. *Thunberg*. It flowers in September, but is as yet a stranger in the gardens of Europe, nor has a figure of this rare plant ever appeared. We have a specimen from its discoverer, the whole aspect of which justifies the sagacious determination of Jussieu, respecting its natural affinity. It ranges near *Tradescantia*, both in the natural and artificial systems; nor is it related, as has been suspected, to *Asparagus* or *Dracena*. The stem is erect, about two feet high, but little branched, angular, jointed, clothed with short, dense, recurved, rigid pubescence. *Branches* alternate, short. *Leaves* crowded about the lower part of the stem; widely scattered above; alternate, elliptic-lanceolate, a foot long, entire, tapering at each end, with a strong mid-rib, and several smaller parallel lateral ones; both surfaces very minutely roughish. *Footstalks* clasping the stem, membranous, ribbed, hairy, abrupt. *Flower-stalks* corymbose, placed about four in a whorl; rough with short reflexed hairs, of few flowers; the partial ones smooth, white, and thickened upwards. *Braætes* membranous, white. *Flowers* snow-white, the size of *Asparagus* blossoms. *Berry* as big as a large pea, its outer surface, even in a dried state, of the most beautiful polished blue, like that given by heat to steel. Internally it is white, and seems to be divided into three cells.

POLLICHIA, a most distinct and curious genus, thus named by Dr. Solander, in honour of John Adam Pollich, M.D. author of an excellent Flora of the Palatinate of the Rhine, in three volumes octavo, full of ample and scientific descriptions. He died in 1780.—Ait. Hort. Kew. ed. 1. v. 1. 5, and v. 3. 505. ed. 2. v. 1. 11. Schreb. 782. Willd. Sp. Pl. v. 1. 23. Mart. Mill. Dict. v. 3.—Class and order, *Monandria Monogynia*. Nat. Ord. *Holeracea*, Linn. *Amaranthi*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, pitcher-shaped, with five furrows and five teeth, permanent; its mouth bordered with an elevated pellucid ring. *Cor.* Petals five, very small, inserted into the ring, alternately with the teeth of the calyx. *Stam.* Filament solitary, incurved, inserted into a fissure in the ring, next to one of the teeth of the calyx, which it scarcely equals in length; anther roundish, incumbent, of two lobes. *Pist.* Germen in the bottom of the calyx, ovate; style thread-shaped, cloven, the length of the calyx; stigmas two, divaricated, obtuse, fringed. *Peric.* none, except the permanent thickened calyx. *Seed* solitary, ovate, filling the cavity of the calyx. *Recept.* of several aggregate scales, sometimes compound; each roundish, fleshy, bearing on its disk a solitary flower, and at length becoming very juicy, pellucid and coloured, supporting the ripened fruit.

Ess. Ch. Calyx of one leaf, with five teeth, permanent. Petals five. Seed one. Scales of the receptacle pulpy, aggregate, supporting the fruit.

1. *P. campestris*. Whorl-leaved Pollichia. Smith Spicil. 1. t. 1. Willd. n. 1. Ait. n. 1.—The only-known species; discovered in sandy fields at the Cape of Good Hope by colonel William Patterfon, who sent its seeds to the late countess of Strathmore and to Kew, in 1780. The plant is biennial in the greenhouse, flowering in autumn. *Root* fibrous. *Stems* numerous, twelve or eighteen inches long, decumbent, branched, leafy, rather shrubby, round, invested with scattered white down. *Leaves* about six in a whorl, unequal, spreading, sessile, linear-lanceolate, entire, tapering at each end, about an inch long, smooth, glaucous, scarcely fleshy. *Stipulas* numerous, small, membranous, lanceolate. *Flowers* in small, axillary, sessile, opposite green heads, at almost every whorl, numerous, small, with white petals. *Fruit* a larger head of crowded, juicy, sweet, pearly-white scales, each supporting a brown calyx, containing one seed.

No genus can be more curious and distinct. It differs from *Blitum*, not to mention other marks, nearly as *Broussonetia* differs from *Morus* (see PAFYRIUS); the fruit or seed being elevated on an enlarged pulpy receptacle, instead of being enveloped in the calyx, become juicy and coloured like a berry. In *Broussonetia* indeed the calyx remains at the bottom of the pulpy receptacle; in *Pollichia* it is elevated upon that part.—Dr. Solander, in his description, overlooked the five white petals; and Willdenow, not having seen the *Spicilegium*, where alone a full description and coloured plate of this plant have appeared, unavoidably copied the error; which also escaped Mr. Dryander in editing the new edition of *Hort. Kew*.

POLLICIPES, the *Toe-shell*, in *Natural History*, the name of a genus of shells, the characters of which are these: they are multivalve flat shells, of a triangular figure, each being composed of several laminæ, which end in a sharp point. They stand upon pedicles, and are furnished with a great number of hairs. We have only one known species of this genus, and this always found in large clusters.

POLLICIS ABDUCTOR, in *Anatomy*. See ABDUCTOR.

POLLICIS Adductor. See ADDUCTOR.

Extensor POLLICIS Brevis, and Longus. See EXTENSOR.

Flexor POLLICIS Brevis, and Longus. See FLEXOR.

POLLINA, in *Geography*, a river of Sicily, which runs into the sea; 10 miles W.N.W. of Mistretta.

POLLINCTORES, among the *Ancients*, an appellation given to those who washed and anointed the dead.

POLLINCTURA, a word used by some authors to express the embalming of dead bodies.

POLLING, in *Gardening*, the operation of dispersing the worm-casts all over the walks, with long ash-poles: this, besides destroying worm-casts, is very beneficial to the grass of the walks. See GRASS-walks.

POLLIO, C. ASINIUS, in *Biography*, an eminent Roman, was born about the year B. C. 76. Although he was descended from an obscure family, he raised himself by his merit to the highest offices in the state. He was consul with Domitius Calvinus, in the year 40 B. C., triumphed over the Dalmatians, and performed much important service to Antony in the civil wars. After this he was regarded as a friend by Augustus, and was looked upon as one of the most illustrious persons of his time. He obtained celebrity as a literary character, ranked very high as an orator, and composed a history of his own times. Horace addresses to Pollio the first ode of his second book, and begins it with an allusion to his intended history of the civil wars. Virgil also, in his third eclogue, records his gratitude to Pollio as the favourer of the muse, and to him he inscribes his fourth eclogue. Pollio was a severe and jealous critic, and some

of his strictures are recorded upon the writings of Livy, Sallust, Cæsar, and Cicero. To the well-earned glory of the latter he was exceedingly inimical. His own style is represented by Quintilian as studied, weighty, and expressive, but hard and abrupt, and approaching more to that of the earlier writers, than to the polish and sweetness of Cicero and his contemporaries. He was a man of extensive erudition and great industry. He wrote a Narrative of Roman affairs; a Grecian history; and likewise composed tragedies in the Greek language. He is said to have been the first who founded a library in Rome for the public use, to which laudable purpose he devoted the spoils he had taken in war. Of his writings nothing remain, excepting a few passages quoted by other authors. He died about the year four of the Christian era, at the age of 80.

POLLIOR, or BELIOR, in *Geography*, an island in the PERSIAN gulf, which see.

POLLIPLE'S ISLAND, a small rocky island, at the N. entrance of the Highlands in Hudson's river.

POLL-MONEY, or CAPITATION, a tax imposed by authority of parliament, on the person, or head, either on all indifferently, or according to some known mark of distinction; as quality, calling, &c.

Thus, by the statute 18 Car. II. every subject in the kingdom was assessed by the *head*, or *poll*, according to his degree; every duke 100*l.*, marquis 80*l.*, baronet 30*l.*, knight 20*l.*, esquire 10*l.*, &c. and every single private person 12*d.*

This was no new tax, as appears by former acts of parliament; particularly that anno 1380, where, *quilibet tam conjugatus quam solutus, utriusque sexus, pro capite suo solvere cogebatur*. Walsing. See CAPITATION.

Camden, in his Remains of Coins, says, there was anciently a personal tribute called *capitatio*, or *poll-silver*, imposed on the poll, or person, of every one; on women from the age of twelve years, and on men from fourteen.

POLLOCK, in *Geography*, a town of North Carolina; 35 miles E.S.E. of Halifax.—Also, a town of North Carolina; 13 miles S.W. of Newbern.

POLLOCK Harbour, a harbour on the west coast of Mindanao. N. lat. 7° 15'. E. long. 124° 42'.

POLLOCKSHAW, a manufacturing town of Scotland, in the county of Renfrew; 5 miles E. of Paisley.

POLLS, a town of the duchy of Stiria; 5 miles N. of Judenberg.—Also, a town of South Carolina; 18 miles W.N.W. of George-town.

POLLUCTUM, among the Romans, a feast kept in honour of Jupiter Dapalis, Hercules, &c. at which sacrifices were offered to the gods.

POLLUTION, POLLUTIO, the act of profaning a temple, or other holy place.

The Romanists hold a church to be polluted by the effusion of blood, or of seed, therein; and require its being consecrated anew.

The Jews were held polluted by the touching of a dead body, or of the menses of women; and were to be purified in form. See the laws relating to it in Leviticus.

The Indians are so superstitious on the head of pollution, that they break all the vessels which those of another religion have drank out of, or even only touched; and drain all the water out of a pond a stranger has bathed in.

POLLUTION, or *Self-Pollution*, is also used for the abusing or defiling of one's own body, by means of lascivious frictions and titillations, raised by art, to produce emission.

We read in Scripture, that Onan, and, as some critics also think, Er, were severely punished for having polluted themselves by spilling their seed on the ground; whence the crime has been denominated, by some, *Onania*.

Of pollutions, some are *voluntary*, others *involuntary*, and *nocturnal*.

POLLUTION, *Pollutio Nocturna*, in *Medicine*, the name of a disease, which consists in an involuntary emission of the seed in the night, in time of sleep. This, in different persons, is very different in degree; some being affected with it only once a week, a fortnight, three weeks, or even a month, and others being subject to it almost every night.

The persons most subject to this are young men of a sanguineous temperament, and who feed high, and lead a sedentary life. When this happens to a person but once in a fortnight or a month, it is of no great consequence; but when it happens almost every night, it greatly injures the health; the patients look pale and sickly. In some the eyes become weak and inflamed; sometimes they are affected with violent defluxions, and usually, at last, are circled round with a livid appearance of the skin.

The distemper is to be cured rather by a change of life than by medicines. When it has taken its rise from high diet and a sedentary life, a coarser food and the use of exercise will generally cure it; but if any medicines are to be given, nitre alone will do more than almost all the rest. This may be taken in large doses, a scruple at a time, with very little liquid with it, and must be continued for some time at night going to rest. The root of the water-lily is greatly recommended by some in this case; and by others, the seeds of the agnus castus; but it is very doubtful whether they have either of them any effect.

Persons subject to this disease must never take any stimulating purges, and must avoid, as much as possible, all violent passions of the mind; and though exercise is recommended in moderation, yet if this be too violent, it will rather increase the disorder than do any thing towards its cure.

The Romish church puts up prayers, in the close of the evening office, to be preserved from nocturnal pollutions.

POLLUTRI, in *Geography*, a town of Naples, in Abruzzo Citra; 9 miles S.E. of Lanciano.

POLLUX, in *Astronomy*, the hind twin, or the posterior part of the constellation Gemini.

POLLUX is also a fixed star of the second magnitude, in the constellation Gemini, or the Twins.

POLLUX is also used in *Meteorology*. See CASTOR.

POLLUX, in *Mythology*, the name of a demi-god, supposed to be the son of Jupiter and Leda, who had a temple in the city of Teraphne, in Laconia, where was also a sacred fountain, called Polydocea, or the fountain of Pollux.

POLLUX, JULIUS, in *Biography*, a grammarian, who was born at Naucratis in Egypt, and flourished in the reign of Commodus, about the year 180. He wrote an epithalamium for that emperor, and opened a school for rhetoric at Athens. He was author of a dictionary, or "Onomasticon," which is extant, and is a valuable aid to the study of the Greek language, and the elucidation of its writers. The best edition of this work is that of Hemsterhuys, 2 vols. folio, Gr. et Lat. 1706. Another author of the same name, but much posterior, wrote a "Chronicon," in Greek, from the creation to the reign of the emperor Valens. Of this there is an edition by Hardt, printed at Leipzig in the year 1792.

Pollux, in his "Onomasticon," treats of music; and in the 4th chapter of his second book, "De voce, aut his quæ a voce derivantur;" ch. 7. lib. 4. "De poetis et cantilenis gentilitiis," of poetry and graceful melody; ch. 8. "De instrumentis musicæ;" of musical instruments invented by different people; of the pulsatile, stringed, and pneumatic kind;

kind; of the music of Olympus, and of the musical contentions at the Pythic games.

POLNA, in *Geography*, a town of Bohemia, in the circle of Czaflau; 22 miles S. of Czaflau. N. lat. $49^{\circ} 30'$. E. long. $13^{\circ} 35'$.

POLNO, a town of Hinder Pomerania; 75 miles W.S.W. of Dantzic. N. lat. $54^{\circ} 3'$. E. long. $16^{\circ} 27'$.

POLNOVATSKOI, a town of Russia, in the government of Tobolsk; 36 miles E. of Berezov.

POLO, MARCO, in *Biography*, a celebrated traveller of the 13th century, was born about the year 1250. His father Niccolo, and uncle Matteo, were two citizens of Venice, who sailed to Constantinople in the reign of the emperor Baldwin II., and in that city Marco was born. The two brothers sailed across the Euxine to Armenia, whence they travelled by land to the court of a considerable Tartarian lord, named Barka. By him they were favourably received; but after a year spent at his capital, they went to Persia, where they remained three years, whence they accompanied a messenger going to the court of Kublai, grand khan of the Tartars, and arrived after a year's journey. Here they were favourably received by the powerful monarch, who was curious in his inquiries concerning the affairs of Europe, and the Christian religion. They gained his confidence so completely, that he determined to dispatch them as his ambassadors to the pope, with the request that he would send persons to instruct his people in the true faith. They set out, and in three years, *viz.* in 1269, reached Italy. At this time there was a vacancy in the popedom, and the brothers remained at Venice two years before it was filled. At length they obtained letters for Kublai from Gregory X., taking with them young Marco, and accompanied by two friars of the order of preachers, they again departed for the east. On their arrival in Armenia, they found the sultan of Babylon at war with that province; on which account the friars refused to advance, but no sense of danger could prevent the Venetians from proceeding on their course; and after a journey of three years and a half, in the midst of dangers and disasters, they came to a city in which Kublai then resided. He was much pleased with their return, and received with the most profound respect the letters of the pope, and a present of some oil from the lamp burning before the holy sepulchre at Jerusalem. To Marco he paid the greatest attention, and the young man in a very short time acquired four different languages of that country, and made himself so acceptable to the khan, that he was employed in various missions to different provinces. In every situation he diligently noticed the manners and customs of the countries of the people among whom he resided; and from the facts which he collected, he afterwards composed his book of travels.

After a residence of 17 years at the court of Kublai, the Venetians were extremely desirous of returning to their native land, and at length obtained permission to accompany the ambassadors of a king of India, who had come to demand a princess of the khan's family in marriage for their sovereign. It was a voyage of 18 months through the Indian sea, before they arrived at the court of this king, named Argon. Thence they travelled to Constantinople, and finally reached Venice in 1295. They returned rich in jewels and valuable effects, after an absence of 26 years, which had so altered them, that they were obliged to make a display of their wealth to procure a reception from their relations. In a very short time, news came to Venice, that the Genoese were approaching with a powerful armament; on which account, a number of galleys were immediately fitted out to oppose them, and Marco Polo was appointed

to the command of one of them. In an engagement that ensued he was taken prisoner, and carried to Genoa. He was, however, well treated, sent for his papers, and employed himself in writing an account of his travels. After this he obtained his liberty, but of his subsequent history nothing is known. His work was probably composed in the Venetian dialect, and from this several versions have been made into the Italian and Latin languages. The best Latin translation is that of Andrew Muller, 1675. It has also been translated into several modern languages. Of the veracity of his relations very different opinions have been given; but in what he asserts from his own knowledge, he seems in general deserving of credit; and perhaps to him Europeans owe the first distinct account of the remoter parts of Asia. *Univer. Hist.*

POLO, in *Geography*, an island in the Pacific ocean, about 50 miles in circumference. N. lat. $14^{\circ} 55'$. E. long. $122^{\circ} 28'$.—Also, a small island in the East Indian ocean, near the N. coast of Samar. N. lat. $12^{\circ} 14'$. E. long. $121^{\circ} 33'$.—Also, a small island in the East Indian sea, near S. coast of Bool. N. lat. $9^{\circ} 40'$. E. long. $124^{\circ} 5'$.

POLOK, a town of Poland, in Podolia; 54 miles N.W. of Kamniec.

POLOLAMOI, a town of Russia, in the government of Olonetz; 100 miles W.S.W. of Kemi.

POLOMA, a town of Africa, in the kingdom of Aweri, on the sea-coast, at the mouth of the river Formosa, inhabited by fishermen; 12 miles S.S.W. of Aweri.

POLOMEN, a town of Prussia, in Natangen; 8 miles N. of Lick.

POLONGHERA, a town of France, in the department of the Stura, on the Po; 13 miles S. of Turin.

POLONHIR, a river of Thibet, formed by the union of several small streams, 20 miles E. of Tchontori, which loses itself in lake Hara.

POLONIA, a river of European Turkey, which runs into the Adriatic, at Pirgo, in the province of Albania.—Also, a small strait that forms the separation of the islands of Milo and Argentiera, called by the Greek navigators the "Pas de Pologne." This passage is too dangerous to be frequented by shipping. At the entrance of this strait, on the coast of Milo, which faces the N.E., is extracted a sort of Cimolian earth, differing very little from that of Argentiera; boats come and load with it, in order to convey it to the other islands of the Archipelago: this earth is even said to be preferred to the true Cimolian earth for washing, but that it is not so proper for scouring and taking out spots. The Greeks call it "pilo," which merely signifies clay.

POLONIA, a town of European Turkey, in Albania, the see of a Greek bishop; 20 miles N. of Valona.

POLONNE, a town of Russian Poland, in Volhynia; 115 miles W. of Kiev.

POLORE, a town of Hindoostan, in the Carnatic; 26 miles S.S.W. of Arcot. N. lat. $12^{\circ} 30'$. E. long. $79^{\circ} 15'$.

POLOROTOVA, a town of Russia, in the government of Irkutsk; 24 miles S. of Kirensk.

POLOTSK, a city of Russia, and capital of a government, to which it gives name, situated on the Duna; 168 miles S.E. of Riga. N. lat. $55^{\circ} 32'$. E. long. $28^{\circ} 20'$.

POLOTSKOE, a government of Russia, bounded on the N.E. by the government of Pskov, on the N.W. by that of Riga, on the S.E. by those of Smolensko and Mogilev, and on the S.W. by Lithuania; about 160 miles in length, and 60 in breadth. This country was formerly

formerly a part of Lithuania: its capital is Polotsk. N. lat. 55° 10' to 56° 16'. E. long. 25° to 31°.

POLPHOS, a word used by some authors to express a bulb or bulbous root.

POLPOCH, in *Zoology*, a species of serpent, said to be found in Yucatan, a country bordering upon New Spain. It can bite with the mouth, and sting with the tail.

POLRITTEN, in *Geography*, a town of Prussia, in Ermeland; 6 miles S. of Heilsberg.

POLTANA, a town of Naples, in Abruzzo Citra; 9 miles S. of Lanciano.

POLTAVA, or PULTAWA, a town of Russia, in the government of Ekaterinoflav, on the Vorekla. This town,

with its regular fort, is subject to a commandant, who resides here. The burghers carry on a considerable trade to the Crimea, and through Poland to Germany. The town is but indifferent, being built after the manner of the Cossack towns; however, it was rendered famous by the siege of the Swedes in 1709; at last it fell into the hands of the Russians, after the defeat of Charles XII. near this place. On an eminence without the town stands a monastery, where the king of Sweden had his head quarters; 84 miles N.N.W. of Ekaterinoflav. N. lat. 49° 30'. E. long. 34° 14'.

POLTIN, or POLPOLTIN, in *Commerce*, a Russian silver coin. The poltin is = 50 copecks, and the polpoltin = 25 copecks.

	Assay.		Weight.			Contents in pure Silver.	Value in Sterling.	
	oz.	dwt.	oz.	dwt.	gr.	grains.	s.	d.
Poltin, or half ruble, of the empress Ann -	W.	1 10	0	7	21	151.2	1	9
Ditto of the empress Elizabeth - -	W.	1 8	0	8	2	156.9	1	10
Ditto of Catharine II. - - -	W.	2 4	0	7	18	137.9	1	7 $\frac{1}{4}$
Ditto of Paul - - - -	W.	0 15	0	6	18	139.8	1	7 $\frac{1}{2}$
Ditto of Alexander (1804) - - -	W.	0 14	0	6	13 $\frac{1}{2}$	136.5	1	7
Polpoltin, or $\frac{1}{2}$ ruble, old - - -	W.	2 6	0	4	1	71.2	0	10
Ditto of Paul - - - -	W.	0 18 $\frac{1}{2}$	0	3	7	67.3	0	9 $\frac{1}{2}$
Ditto of Alexander (1802) - - -	W.	0 13 $\frac{1}{2}$	0	3	9 $\frac{1}{2}$	70.8	0	10

N. B. W. denotes worse than the English standard.

The poltin, or half ruble, bears the same impressions as the ruble, according to the period at which it was coined, except that the inscription contains the word "POLTINA," instead of "RUBLE:" and the quarter ruble is marked "POLUPOLTINICK."

POLTROON, or POLTRON, a coward, or dastard, wanting courage to perform any thing great or noble.

The word we borrow from the French, who, according to Salmafius, derive it à *pollice truncato*; because, anciently, those who would avoid going to the wars, cut off their thumbs.

But Menage, with more probability, derives it from the Italian *poltrone*, and that from *poltro*, a bed; because timorous pusillanimous people usually take pleasure in lying a-bed. He adds, that the Italian *poltro* is again derived from the German *polster*, a pillow, or cushion.

Others choose to derive the word from the Italian *poltro*, *colt*; because of that creature's readiness to run away.

POLTROON, in *Falconry*, is a name given to a bird of prey when the nails and talons of his hind toes are cut off, in which his chief force and armour lay; in order to intimidate him, and prevent his flying at great game.

POLTURAT, in *Commerce*, a copper coin of Hungary, which sometimes contains a little silver. A polturat is accounted = 6 pfenings, and a creutzer is 4 pfenings.

POLTZIN, in *Geography*, a town of Pomerania, near which are some medicinal springs and baths; 32 miles S.E. of Colberg. N. lat 53° 46'. E. long. 16° 4'.

POLTZNITZ, a river of Saxony, which runs into the Elster, at Elsterwerda.

POLVERINE, the calcined ashes of a plant; a substance of the nature of our pot-ashes, or pearl-ashes.

It is brought from the Levant and Syria; but in the glass trade, though it be of the nature of the other ashes they use, it is always to be preferred to any other. The barilla, or pot-ashes of Spain, yield more pure salt than the pulverine of the Levant, but the glass made with it has always

some tinge of blueishness: that made with the pulverine is ever perfectly white, and this is the substance that ought always to be used for the finest crystal. See GLASS.

POLUKSHA, in *Commerce*, a copper coin of Russia = $\frac{1}{4}$ copeck.

POLURA, in *Ancient Geography*, a town of India, on this side of the Ganges, between the first and second mouth of that river, on the western side of it. Ptolemy.

POLURA, in *Geography*, a town of Walachia; 20 miles N.E. of Tergofyl.

POLY, a town of Hindoostan, in Vissapour; 20 miles N.W. of Sattarah.

POLYACANTHA, in *Botany*, a name adopted by Vaillant, for a genus of the thistle family, expressive of its numerous thorns. This genus is included under the *Cnicus* of Linnæus.

POLYACOUSTICS, compounded of *πολυς*, *much*, and *ακουω*, *I hear*, instruments contrived to multiply sounds; as multiplying-glasses, or polyscopes, do the images of objects. See PHONICS.

POLYADDEN POINT, in *Geography*, a cape in the English Channel, on the S. coast of Cornwall; 2 miles W. of Deadman's Point.

POLYADELPHIA, in *Botany*, from *πολυς*, *many*, and *αδελφοι*, *a brother*, the 18th class of the artificial-system of Linnæus, is distinguished by having the stamens united into many, or at least more than two, sets or parcels. See DIADELPHIA.

The orders are not distinguished by Linnæus with his wonted accuracy or consistency, he having adverted only to the number of the stamens, not to their insertion. The writer of the present article has therefore proposed the following arrangement. See *Introd. to Botany*, ed. 3. 340.

Ord. I. *Dodecandria*. Stamens, or rather anthers, from twelve to twenty, or twenty-five, their filaments unconnected with the calyx. To this belongs *Theobroma*, the Chocolate; as well as *Bubroma* of Schreber, and *Abroma* of Jacquin; likewise *Monsonia* and *Citrus*. The latter has about nine-

teen or twenty stamens, combined variously and unequally in several distinct parcels, which are all inserted into the receptacle; and not by any means into the calyx, as the character of the class *Icosandria*, and consequently of every order so named, requires.

Ord. 2. *Icosandria*. Stamens numerous, their filaments inserted (in several parcels) into the calyx. To this is to be referred *Melaleuca* and its allies, a genus erroneously placed by Linnæus in the next order.

Ord. 3. *Polyandria*. Stamens numerous, unconnected with the calyx, of which *Hypericum* is the principal genus. See also *Durio*, *Glabraria* and *Lubea*, all which properly belong to this class and order.

POLYÆGOS, in *Ancient Geography*, one of the Cyclades, situated very near the E. of the isle of Melos, and S.E. of Cimolis.

POLYÆNUS, in *Biography*, a native of Macedon, flourished about the year 180, and wrote in Greek a work on "Military Stratagems," which he dedicated to the emperors M. Antoninus and Verus. It is characterised as an entertaining performance, written in an easy and elegant style, and though in many respects it is trifling, it contains some curious information. It was first published in 1589. An improved edition was given by Masvicius in 1690, and another by Murfinna in 1756.

POLYANDRIA, in *Botany*, from *πολυς*, many, and *ανδρ*, a man, the 13th class of the Linnæan artificial system, characterised by having numerous stamens, from twenty to any greater number, inserted into the receptacle, and not at all connected with the calyx, which often falls off as soon as the flower expands. By this mode of insertion the class is essentially distinguished from the 12th, ICOSANDRIA; see that article. A most essential difference exists between the plants composing these two classes. Those of the *Polyandria* scarcely produce any pulpy or eatable fruits, but are in all their parts frequently of an acrid or narcotic quality. The class however being of a more artificial and heterogeneous nature than the *Icosandria*, no absolute rule can be laid down on this subject.

The orders are distinguished by the number of styles. *Monogynia*, the first, subdivided according to the number of petals, abounds with stately exotic trees, and other plants, with handsome flowers. The five following Linnæan orders, *Digynia*, *Trigynia*, *Tetragynia*, *Pentagynia*, and *Hexagynia*, might be most conveniently united into one, perhaps under the name of *Pentagynia*, as we have recommended under *Icosandria*. Possibly the term *Heterogynia* might be eligible for such an order, as different species of several of its genera disagree in the number of their styles. *Polygynia*, the last order of the present class, has numerous styles, and is furnished with abundance of handsome and important genera, beautiful in their flowers, but often very acrid or poisonous in their qualities.

POLYANDRIA is likewise the name of a considerable order in the class *Monadelphia*, consisting chiefly of the columiferous, or mallow, tribe. There are also orders under the same denomination and character, in the classes *Polyadelphia*, *Monoecia*, and *Dioecia*; as well as in that of *Gynandria*, according to Linnæus; but of the latter no certain example can, on correct investigation, be found.

POLYANDUS, in *Ancient Geography*, a town of Asia, in Armenia Minor, and in the prefecture called Cataonia. Ptolemy.

POLYANTHEA, a collection of common-places in alphabetical order; of great service to orators, preachers, &c. of the lower class.

The word is formed from the Greek *πολυς*, much, and

ανθος, flower; and is much of the same significance with *anthology*, or *florilege*.

The first author of the *polyanthea* was Dominic Nanni de Mirabellio, whose labour has been improved on by Barth. Amantius, and Franc. Torsius; and since these, by Jos. Langius, under the title of "*Polyanthea nova*," 1613.

POLYANTHEMUM, in *Botany*, a name given by some authors to the water crow-foot, from its great number of flowers.

POLYANTHES, in *Botany* and *Gardening*. See POLIANTHES.

POLYANTHUS, or POLYANTHIUM, compounded of *πολυς*, much, and *ανθος*, flower, a garden flower, of the primrose kind. (See PRIMULA.) The word is also used, in general, to denote a plant which bears or produces several or more flowers.

POLYANTHUS-Narcissus. See NARCISSUS.

POLYBIUS, in *Biography*, an eminent Greek historian, was born at Megalopolis, in Arcadia, about the year 203 B.C. His father was Lycortas, a prætor of the Achæan republic, and an intimate friend of PHILOPOMEN, (see his article). He was brought up to arms and public affairs, and at the age of twenty-four, he was one of the deputies sent by the state to negotiate with Ptolemy Epiphanes. After this he was employed in various other embassies, and at length, when the Romans found it necessary no longer to preserve appearances with the Greeks, he was one of the thousand suspicious persons demanded of the Achæans as hostages to be detained under custody in Italy. Polybius was kept in close custody at Rome, and not suffered to plead before the senate in favour of his countrymen. By his learning, virtue, and talents, he ingratiated himself with many of the most eminent senators, especially with the two sons of Paulus Æmilius. Through the interest of the latter, the exiles, after seventeen years absence from their country, were permitted to return to Greece, but only three hundred survived to enjoy that liberty. Polybius himself not wishing to see his native land in its humiliated state, chose to remain at Rome, and attach himself to the service of Scipio Æmilianus, whom he accompanied into Africa, and materially aided by his counsel. After this he was witness to the sack and destruction of Corinth, and of the reduction of Achaia to the condition of a Roman province. Amidst these dreadful scenes he displayed noble traits of patriotism and disinterestedness, which obtained for him so much credit, that he was entrusted with the care of settling the new form of government in the cities of Greece, which office he performed to the satisfaction both of the Romans and the Greeks. The people of Achaia erected several statues to his honour. He accompanied Scipio to the siege of Numantia; and upon the subsequent death of his great friend and benefactor, he retired to his native country, where he died, in consequence of a fall from his horse, at the age of eighty-two. During a long period of his life he employed his leisure and opportunities in composing a history from the beginning of the second Punic war, to the subversion of the Macedonian kingdom, a period of fifty-three years. It was comprised in thirty-eight books, besides two introductory ones, containing an abridgment of the Roman history from the taking of Rome by the Gauls. The history of Polybius has been styled the Catholic or Universal History, because though chiefly devoted to Roman affairs, yet it relates the contemporary transactions in several other countries. Only a very small part of this work remains, viz. the first five books, which are entire, and considerable fragments of the twelve following. No historian of antiquity is more valuable for the accuracy and

and fidelity of his narrations, and the abundance of his information. His style is not to be commended, and he is one of those authors who are read exclusively for their matter. He has been closely copied in many parts by Livy. Marcus Brutus was so fully sensible of his value, that he studied him even in the midst of his most anxious engagements. The editions of Polybius that are most esteemed, are Casaubon's, Paris, 1609. fol.; Gronovius's, Amst. 3 vols. 8vo. 1670; and Schweighauser's, Leipf. 9 vols. 8vo. 1789-93.

POLYCARDIA, in *Botany*, a name of Jussieu's, composed of *πολυ*, many, and *καρδια*, a heart, and suggested by the inversely-heartshaped figure of the numerous leaves that bear the flowers, whose midrib is, by that circumstance, arrested in its growth, and the sides protruded, in two lobes, beyond it.—Juss. 377. Willd. Sp. Pl. v. 1. 1121. Lamarck Illustr. t. 132.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Rhamni*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, flat, very small, in five rounded unequal segments. *Cor.* Petals five, rounded, spreading, sessile, equal. *Stam.* Filaments five, awl-shaped, much shorter than the petals, opposite to the segments of the calyx; anthers roundish, two-lobed. *Pist.* Germen superior, roundish; style columnar, very short; stigma notched. *Peric.* Capsule ovate, slightly furrowed, of five thick, woody, at length flattened valves, and as many cells; the partitions narrow, from the centre of each valve. *Seeds* few, oblong, inserted at the base of the partitions, on each side, each seed half enclosed in a cup-like lacinated tunic.

Ess. Ch. Petals five, rounded, spreading. Stigma notched. Capsule ovate, woody, with five flattened valves. Seeds with lacinated tunics.

Obf. Jussieu remarks, that the capsule has occasionally but three or four valves, and as many cells; which almost reduces this genus to *Celastrus*, unless the woody and flattened valves may keep it distinct. We propose it here for the sake of enquiry. Commerçon appears to have chosen this shrub to perpetuate his own memory, having in his herbarium marked the specimens *Commerçonia*. Willdenow applied a vile specific name, which we do not think it incumbent on us, in defiance of all principle and harmony, to retain, it having been no where else received.

1. *P. epiphylla*. (*P. madagascarensis*; Willd. n. 1.)—Gathered in Madagascar, by Commerçon, some of whose specimens, in flower and fruit, are before us. The stem is shrubby, with round smooth branches. Leaves scattered, stalked, two or three inches in length, elliptic-oblong, bluntish, entire, thick-edged, coriaceous, smooth, single-ribbed, obscurely veined; tapering at the base, into a channelled footstalk about an inch long. Some leaves, which Jussieu terms winged flower-stalks, are stopped at about the middle of their growth by producing fructification at their apex, beyond which each side of the leaf is afterwards gradually extended into a rounded lobe, rendering the whole inversely heart-shaped. In the sinus thus formed stand three or four sessile flowers, much like those of an *Euonymus*. The capsules are ovate, hard, smooth, three quarters of an inch long, externally dark brown, internally pale and shining. Lamarck's plate represents every part with great fidelity; but we wonder how he, who has omitted to figure *Celastrus*, because of its near affinity to *Euonymus*, could retain the present as a distinct genus. Willdenow's description is evidently made from Lamarck's engraving.

POLYCARP, SAINT, in *Biography*, an apostolical Christian father and martyr, supposed to be a native of Smyrna, in Asia Minor, and born during the reign of Nero.

He was a disciple of the apostle John, by whom he was instructed in the truths of the Christian religion, and appointed bishop of Smyrna. By some he is thought to have sat under the instructions of some other of our Lord's apostles; there seems no doubt that he conversed with several who had heard and seen our Lord, and by many he is thought to have been the angel of the church of Smyrna, to whom the epistle in the second chapter of the book of Revelation was directed to be sent; and those who have carefully investigated the subject, generally admit, that the character and circumstances which St. John ascribes to that angel, seem to agree very exactly with those of Polycarp. In a few years after the death of the apostle John, Ignatius, who had been condemned to suffer death at Rome, having in his voyage been permitted to land at Smyrna, was visited by Polycarp, who comforted and encouraged him under his sufferings. Some years after this, a controversy having arisen between the Eastern and Western churches respecting the proper time for celebrating Easter, Polycarp took a journey to Rome to confer with Anicetas, bishop of that city, on the subject, and, if possible, to terminate the warm disputes which it had occasioned. Though this conference did not produce the desired effect, Polycarp and Anicetas agreed in this, that the bonds of charity were not to be broken on account of the controversy. While Polycarp continued at Rome, Irenæus informs us, that he made many converts, to the simplicity of Christian doctrine, which he had learned from the apostles, from among the followers of Valentinus and Marcion. Some years after the return of Polycarp from Rome, and under the reign of the emperor Marcus Aurelius; the Christians were persecuted in all parts of the Roman empire with unrelenting rigour; and many were called upon at Smyrna, among other places, to seal their profession with their blood. In this persecution Polycarp suffered martyrdom. His martyrdom happened, according to bishop Pearson, who supposes it to have taken place under Antoninus the Pious, in the year 148. St. Jerom, in his work of Illustrious Men, speaks of Polycarp "as the prince of all Asia, inasmuch as he had seen and been taught by some of the apostles, and those who had seen the Lord." Afterwards he adds, "in the reign of Marcus Antoninus and L. Aurelius Commodus, in the fourth persecution after Nero, he was condemned to the flames at Smyrna, the proconsul being present, and all the people demanding his death. He wrote to the Philippians a very useful epistle, which to this day is read in the assembly of Asia." The judicious Lardner feels that there is great difficulty in ascertaining the exact period of his martyrdom: "We have," says he, "the relation of his martyrdom in a letter of the church of Smyrna to the church of Philadelphia, and other churches. In this relation Polycarp says to the proconsul; 'Eighty and six years have I now served.' Understand this of his life; and according to every calculation of the time of his death, he lived a good while in the first century. Understand it of his Christianity, as Tillemont does, and being martyred, as he says, in 166; his conversion to Christianity happened in the year 80. Understand it of his serving Christ in the ministry; and he was bishop of Smyrna from the year 84, according to Basnage." Lardner himself thinks, the martyrdom of Polycarp happened about the year 169. Great pains were taken to make him recant, but he refused; and when told if he persisted in his obstinacy he should be burnt alive, he exclaimed, "Thou threatenest me with fire, which burns for an hour, and is then extinguished; but thou art ignorant of the judgment to come, and of the fire of everlasting punishment, reserved for the wicked in the other

world: why dost thou delay?" Finding him immoveable, the proconsul ordered proclamation to be made three times, that Polycarp had persisted in professing himself a Christian; after which, on the unanimous demand of the infuriated multitude, he was sentenced to be immediately committed to the flames. Polycarp is supposed to have written several epistles to the neighbouring churches to confirm them in their Christian faith, and some others to exhort and encourage the brethren to persevere in the truth. These pieces are all lost, excepting his short "Epistle to the Philippians," which is thought to have been written soon after the death of Ignatius, and consists of admirable precepts, counsels, and exhortations, intermixed with numerous quotations from the books of the New Testament, and written with great elegance and simplicity. This epistle has frequently been reprinted; archbishop Usher published it, in Greek and Latin, at Oxford in 1648: and English editions of it have been given by archbishops Wake and Cave. See Lardner, vol. ii. edition 1788.

POLYCARPÆA, in *Botany*, see **HAGÆA**. This genus ought probably to be united with **POLYCARPON**, see that article; for Mr. Ferdinand Bauer's discovery of the variability of number in the latter, with respect to the stamens and pistil, removes the distinction between those two genera. Some flowers of *Polycarpon tetraphyllum* are shewn by him to assume the essential characters of *Hagæa*.

POLYCARPON, from *πολυς*, many or much, and *καρπος*, fruit; a name applied to various plants, but now appropriated to the present, which forms a genus, and to which it is as suitable as to any.—Linn. Gen. 42. Schreb. 58. Willd. Sp. Pl. v. 1. 490. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 162. Fl. Græc. Sibth. v. 2. 4. Ait. Hort. Kew. v. 1. 184. Juss. 299. Lamarck Illustr. t. 51. Gært. t. 129.—Class and order, *Triandria Trigynia*. Nat. Ord. *Caryophyllei*, Linn. Juss.

Gen. Ch. Cal. Perianth inferior, of five ovate, concave, keeled, pointed, permanent leaves. Cor. Petals five, much shorter than the calyx and alternate with it, obovate, obtuse or emarginate, withering. Stam. Filaments three, thread-shaped, half the length of the calyx; anthers erect, roundish, of two lobes. Pist. Germen superior, ovate; styles three, spreading, very short; stigmas obtuse. Peric. Capsule ovate, of one cell and three valves, enclosed in the permanent calyx. Seeds numerous, small, kidney-shaped.

Obs. Mr. Ferdinand Bauer, the excellent artist, and travelling companion, of Dr. Sibthorp, observed the stamens to be, in some flowers, five, while the style in such was simple and undivided; probably imperfect. See **POLYCARPÆA**.

Ess. Ch. Calyx of five leaves. Petals five, obovate, minute. Capsule superior, of one cell and three valves. Seeds numerous.

1. *P. tetraphyllum*. Four-leaved All-seed. Linn. Sp. Pl. 131. Sm. Fl. Græc. Sibth. t. 102. Engl. Bot. t. 1031. (*Anthyllis marina incana alfinefolia*; Ger. Em. 622. *Paronychia altera*; Matth. Valgr. v. 2. 389.)—A very common weed in dry sandy waste ground, throughout the south of Europe, and north of Africa, flowering all through the summer, as well as in mild winter, or spring, weather. With us it is scarcely found except on the coasts of Devonshire and Dorsetshire. At Rome it occurs in the streets, and on the steps of buildings. Dr. Sibthorp observed it by way-sides, throughout the Archipelago. The root is annual, simple, branched copiously below. Stems numerous, spreading on the ground in every direction, from two to six inches long, branched, divaricated, zigzag,

leafy, round, smooth, often purplish. Leaves generally four together at each joint, obovate, entire, smooth, single-ribbed, rather fleshy, with very short footstalks. Stipulas opposite, lanceolate, acute; membranous, torn. Panicles copious, terminal, repeatedly forked, many-flowered. Bractees like the stipulas, in pairs at each subdivision. Flowers small, inodorous. Calyx green, pale at the edges. Petals white.

POLYCEPHALON, *πολυκεφαλον*, in *Antiquity*, a kind of poetry, for the nature and origin of which see Mem. de l'Acad. Roy. des. Insc. vol. xiv.

POLYCEPHALOS, in *Botany*, so called by Forskall, Ægypt-Arab. 154, from its numerous heads of flowers. See **SPILÆRANTHUS**.

POLYCHREST, *πολυχρηστος*, compounded of *πολυς*, much, and *χρηστος*, useful, in *Pharmacy*, a medicine that serves for many uses, or that cures many diseases.

POLYCHREST, *Sci.* See **SAL-Polychrest**.

POLYCHROA, in *Botany*, a genus of Loureiro's, with which we are unacquainted, named by him from *πολυς*, many, and *χρως*, colour, in allusion to the particoloured foliage.—Lour. Cochinch. 559. Willd. Sp. Pl. v. 4. 393.—Class and order, *Monocia Pentandria*. Nat. Ord. *Holeraceæ*, Linn. *Amaranthi*, Juss.

Gen. Ch. Male flowers underneath, on a long common stalk. Cal. Perianth bell-shaped, in five nearly ovate, incurved, keeled, coloured segments. Cor. none. Stam. Filaments five, swelling, pellucid, spreading, longer than the calyx; anthers somewhat arrow-shaped.

Female flowers nearly sessile, above the male, on the same plant. Cal. Perianth inferior, in five deep, erect, awl-shaped, permanent segments. Cor. none. Pist. Germen oblong; style none; stigma obtuse. Peric. Capsule ovate, of one cell. Seed solitary, ovate, smooth.

Ess. Ch. Male, Calyx bell-shaped, five-cleft. Corolla none.

Female, Calyx in five deep segments. Corolla none. Stigma solitary, sessile. Capsule with one seed.

1. *P. repens*. Lour. n. 1. Willd. n. 1.—Native of moist rocks about fountains in China and Cochinchina, in which countries it is also cultivated for its beauty. The root is perennial. Stems herbaceous, creeping extensively, round, red, juicy, branched, throwing out short lateral radicles. Leaves alternate, oblong, somewhat crenate, variegated with green, white, and red, obtuse; heart-shaped and unequal at the base. Stipulas in pairs, acute. Flowers red and white, in small axillary clusters.

POLYCHROITE, in *Chemistry*, a name given by Bouillon Lagrange and Vogel, to the colouring matter of saffron, formerly considered as extractive, but which is now thought to be a peculiar vegetable principle. In order to obtain it, we have only to digest saffron in water, evaporate the liquid to the consistence of a thick syrup, and digest this residue in alcohol. When the alcohol is evaporated, polychroite remains behind in a state of purity.

The properties of this substance are as follow:

It has a very intense yellow colour; its taste is bitter, similar to that of saffron, and it has an agreeable smell:—it dissolves readily in water and alcohol, but scarcely in ether, and not at all in fat and volatile oils:—when the solution of polychroite is exposed to the light, it gradually loses its colour: its colour is likewise destroyed by oxymuriatic acid; the addition of a few drops of sulphuric acid changes its colour to an intense and beautiful blue; nitric acid in like manner renders it green:—it combines with lime, potash, and barytes, forming with these bases soluble and insoluble compounds:—when sulphate of iron is dropped

dropped into a solution containing it, a dark brown precipitate is formed:—it stains cloth of an intense yellow colour:—when distilled, it yields an acid liquid, a yellow-coloured oil, and carbonic acid gas, and carburetted hydrogen gas; the acidulous liquid contains ammonia: the charcoal, when incinerated, leaves traces of carbonate, sulphate, and muriate of potash, of carbonates of lime and magnesia, and of iron. *Ann. de Chim.* vol. 80.

POLYCLETUS, in *Biography*, a famous sculptor of antiquity, was a native of Sicyon, and flourished about the year 430 B.C. He was supposed to have carried the art to the highest degree of perfection, at least as far as the excellence of single figures could go. One of his figures, representing a life-guard of the king of Persia, was performed in such exact proportions, that it was called *the rule*, and artists came to study it as a model. He made the statue of a boy, which was estimated at a hundred talents, or perhaps nearly 20,000 pounds, according to our mode of reckoning. The emperor Titus had two naked boys playing at a game by his hand, which was considered as a perfect performance. It was peculiar to him, that he formed almost all his figures supported on one thigh, which made them appear deficient in variety.

POLYCNEMUM, in *Botany*, *πολυκνέμων* of the Greeks, from *πολυς*, many, and *κνήμη*, a leg, a name adopted by Linnæus, for the present genus of little slender-stalked plants.—*Linn. Gen.* 25. *Schreb.* 33. *Willd. Sp. Pl.* v. 1. 192. *Mart. Mill. Dict.* v. 3. *Ait. Hort. Kew.* v. 1. 79. *Juss.* 84. *Lamarck Illustr.* t. 29. *Gærtn.* t. 128.—Class and order, *Triandria Monogynia*. *Nat. Ord. Holeraceæ*, *Linn. Atriplices*, *Juss.*

Gen. Ch. *Cal.* Perianth inferior, of five ovate, erect, pointed, permanent leaves. *Cor.* none. *Stam.* Filaments three, sometimes but two, capillary, shorter than the calyx; anthers of two lobes. *Pist.* Germen roundish, superior; style very short, cloven; stigmas obtuse. *Peric.* Capsule ovate, depressed, and bordered at the summit, pointed with the permanent style, membranous, thin, without valves, and not bursting. *Seed* solitary, kidney-shaped, stalked.

Obs. The leaves of the calyx are said, by Pallas and Schreber, to vary in number, from two to five, and the stamens from one to five; the style is also, in some instances, double. Linnæus seems latterly to have taken the bractæas for a calyx, the perianth for a corolla, in which he is followed by Willdenow and Hort. Kew.

Ess. Ch. Calyx of five leaves. Corolla none. Style divided. Capsule membranous, not bursting. Seed one.

1. *P. monandrum*. “Pallas Travels, v. 1. append. n. 94. t. G. f. 1.” *Willd. n. 1.*—Stamen one. Leaves linear, acute. Stem erect.—Gathered by Pallas in Siberia, on a dry saltish soil, below the entrenchment of the Calmucks. Perennial. We have seen no specimen.

2. *P. sclerospermum*. Pallas Travels v. 3. append. n. 84. t. M. f. 2. e, E. *Willd. n. 2.*—Stamens two. Leaves cylindrical, fleshy. Stem erect, branched.—Native of muddy salt places, in the drier parts of the Siberian desert, not uncommon, flowering before August, and ripening seed in October. The root is annual. *Herb* from four to ten inches high, much branched, spreading, glaucous, succulent, brittle though rigid. *Leaves* scattered, sessile, cylindrical, awl-shaped, tipped with a spine, fleshy. *Flowers* axillary, solitary, sessile, with a pair of awl-shaped bractæas. The germen and calyx harden into a sort of nut, and the seed is spiral.

3. *P. arvense*. *Linn. Sp. Pl.* 50. *Willd. n. 3.* *Ait. n. 1.* *Jacq. Austr.* t. 365. (*Anthyllis altera italorum*; *Ger. Em.* 623.)—Stamens three. Leaves awl-shaped, tri-

angular. Stem diffuse.—Native of fields in the southern parts of Europe, unknown in England, except in curious botanic gardens. A small annual herb, with no pretensions to beauty. The stem is branched and spreading from the bottom, to the extent of a span. *Leaves* numerous, scattered, slender, rigid, an inch long, with axillary tufts of smaller ones. *Flowers* very small, axillary, sessile, whitish, with a pair of pale divaricated bractæas to each.

4. *P. falsum*. *Willd. n. 4.* (*P. triandrum*; Pallas Travels v. 1. append. n. 95. t. G. f. 2, and H. f. 1.)—Stamens three. Leaves thread-shaped, fleshy, sheathing. Stem diffuse.—Found by Pallas in moist, sandy, rather salt situations in Siberia. Perennial. The leaves are thicker and more fleshy than in the last, fringed at their base, and somewhat recurved. The young branches are silky.

5. *P. oppositifolium*. Pallas Travels v. 1. append. 98. t. H. f. 2.—Stamens five. Leaves opposite, fleshy, semi-cylindrical. Stem erect. Gathered by Pallas in salt marshes, about the Caspian sea. Annual. We have seen no specimen.

POLYCOMBUS, a name given by Neophytus and others to the common knot-grass, more usually called *polygonum*.

The name *polycombis* is formed of the Greek *πολυς*, many, and *κομβος*, a joint; and as it is usually applicable to this, and all the other jointed plants, it is used by some for the name of the several species of equisetum, or horsetail, as the word *polygonum* is.

Neophytus describes one species of this, which he says is called *oreon*, from its growing in mountainous places. This, he says, looks like a young reed, and has several joints in the main stalk, which are received into one another as so many cups or boxes: he adds, that the leaves are like those of the pine-tree. What he calls the leaves, are probably the tender branches; and then this description will agree very well with our great marsh horsetail, which grows in wet places in mountainous countries, and about the springs in our hills. This is the horsetail to which the greatest virtues are attributed by this author; but the whole account of the hippuris, polygonum, and equisetum, is so confused, that there is little to be learnt from what the ancients say of them, without repeating the trials of their virtues.

POLYCRATES, in *Biography*, a celebrated bishop of Ephesus, who flourished towards the close of the second century, was the eighth Christian bishop of his family, and is spoken of by Jerome as a person of considerable abilities and authority, who flourished under the reign of the emperor Severus. About the year 196, he called a numerous synod of the bishops of Asia, concerning the existing controversy about the time of celebrating Easter, which was then kept by the churches of Asia Minor on the fourteenth day of the moon, on whatever day of the week it happened; but by the Romans, and most other churches, on the Lord's day following. Victor, bishop of Rome, required the bishops of Asia to follow the custom of other churches. Polycrates, having consulted the bishops of Asia, wrote a letter, with their approbation, to Victor and the church of Rome, declaring their resolution to keep Easter at the time they had hitherto observed it: upon this Victor excommunicated all the churches of Asia, and those in the neighbourhood. The letter which Polycrates sent to Victor is no longer extant, but there are two fragments of it preserved by Eusebius, containing allusions to passages in the New Testament, or quotations from them, which Dr. Lardner has brought to confirm

confirm the authenticity of the Christian scriptures. Lardner, vol. ii. edition 1788.

POLYCROTA, in the *Naval Architecture of the Ancients*, a word used to express such of their galleys as had three, four, five, or more tiers of rowers, seated at different heights; they were distinguished by this term from the *monocrota*, or those which had only single rows of oars. The number of rows of rowers in the polycrota galleys has given occasion to some to suppose those vessels of such a height from the water as is scarcely credible; we have, however, no warrant for this, but the commentators have given occasion to the opinion, from their not having been able to stow the rowers in less room, and have measured the height of the vessel by their own skill in this sort of architecture, not by that of the people who built them. Meibomius has found a way to take off a great deal from the imaginary height of these galleys. He has two inventions to answer this purpose; by the first of them, he shews how the lateral rowers may be so placed, that he who sits behind another may move his hands and oar under the seat of the rower who sits next before him; by which means three lateral rowers, which, according to Scaliger's way of reckoning, would require thirteen feet and a half, will be placed in the height of seven feet and a half.

By the second invention, he finds out a place in the vessel for almost half the number of rowers; forasmuch as on the sides of the aforesaid rowers, he places others in the middle of the ship, upon transra or transverse seats, which he imagines thrust out their oars under the seats of the lateral rowers; by this contrivance he has gained no less than nine feet in the height of a quinqueremis. The different series of rowers were called by different names; the *thalamitæ* were those who sat in the lowest row; the *zygitæ* were those who sat in the transra, or cross seats; and the *thranitæ*, those who sat uppermost of all in the vessel.

The most surprising account of a polycrota vessel among the ancients, is that said to have been built by Philopater, of forty tiers of rowers. The next to this is that of Ptolemy Philadelphus, which is said to have had thirty tiers; and in these there sat more than three thousand rowers. It has been disputed by many, whether such immense vessels as these were ever built, or ever could be used if built. The monstrous height they have been calculated to be of, according to the schemes of the generality of commentators, has rendered it incredible, that there were ever any such; but Meibomius has found out such convenient ways of placing the rowers in them, and has taken off so great a part of this imaginary height necessary in them, that he is clearly of opinion, that there were such vessels actually built and used.

The triremis, according to the computation of this author, contained two hundred men; of which one hundred and eighty were rowers, and the rest were mariners; so that the Athenian fleet, of which Conon was commander, consisting of one hundred and eighty triremes, had in it six and thirty thousand men. The quinqueremis of these times contained four hundred and twenty men, three hundred of whom were rowers, and the rest soldiers; so that there are three stupendous things to be observed in regard to the Roman fleet at Messina and the Carthaginian at Lilybæum: one is, that the former consisted of three hundred and thirty, and the latter of three hundred and fifty vessels, most of which were quinqueremes, which, according to the most accurate computation, were a hundred and fifty feet long; the number of men they contained was, in the Roman, one hundred and thirty thousand, and in the Carthaginian, one hundred and fifty thousand. The apparatus and provisions necessary

for such a numerous host, are wonderful in these early days of shipping, and the accounts would be doubted, were they not given by one of the best of historians, Polybius, who wonders, as indeed he very well may, at such an amazing equipage for sea service at such a time.

POLYDIPSIA, in *Medicine*, from πολυ, much, and διψα, thirst, signifies immoderate or morbid thirst.

This excessive or morbid thirst is seldom to be considered as itself a disease, being generally a symptom of some other morbid condition, either of the stomach, or of the constitution at large. Sauvages makes three species of polydipsia, according to the different morbid affections with which it is connected. Thus, 1. Polydipsia *febrilis* is the thirst connected with a state of general fever, of which it is usually a concomitant symptom, though not so prominent as to characterise the disease. 2. Polydipsia *hydropica* is the thirst which accompanies dropsy, when it is extensive, under all its forms, in consequence of the great abstraction of the watery part of the blood from the circulating mass, which the effusion of serum into the cavities and cellular membrane occasions. And 3. Polydipsia *fluxuum* is the thirst which is the result of profuse discharges of any kind, by which the quantity of fluids in the body is much diminished, as in cases of diabetes, salivation, profuse sweating, hæmorrhages, and the like. In the case of diabetes, indeed, the immoderate thirst is often the most prominent symptom, and claims the patient's attention, before the excessive flow of urine is noticed; and when this discharge is noticed, it is often considered for some time as the mere consequence of the inordinate quantity of drink taken in; so that diabetes has been sometimes denominated polydipsia. (See **DIABETES**.) In all these cases, however, the object of medical treatment is the removal of the primary disease, of which the extraordinary thirst is symptomatic, and not of the thirst itself.

POLYDORA, in *Ancient Geography*, an island situated in the vicinity of Cyzicus, according to Pliny, Diodorus Siculus, and Steph. Byz.

POLYEDRON. See **POLYHEDRON**.

POLYEIDÆ SPHRAGIS, the name of a sort of troches or pastils greatly used among the ancients. They consisted of alum, four drachms; myrrh and aloes, of each five drachms: pomegranate-peel, and bull's gall, of each six drachms: all of which were rubbed to fine powder, and made into troches with the bull's gall, mixed with a sufficient quantity of the most austere wine.

POLYGALA, in *Botany*, an ancient name, composed of πολυ, much, and γαλα, milk, alluding to the reputed effects of the plant, on cattle that fed upon it; but to what plant the name, or the virtues, are rightly to be attributed, we are ignorant. Our common Milkwort appears to have no other claim than ancient usage to this appellation.—Lian. Gen. 364. Schreb. 482. Willd. Sp. Pl. v. 3. 871. Mart. Mill. Dict. v. 3. Sin. Fl. Brit. 752. Prodr. Fl. Græc. Sibth. v. 2. 51. Ait. Hort. Kew. v. 4. 242. Thunb. Prodr. 120. Pursh. 458. Juss. 99. Lamarek Illustr. t. 598. Gærtn. 1. 62.—Class and order, *Diadelphia Oðandria*. Nat. Ord. *Lomentaceæ*, Linn. *Pediculares*, Juss.

Gen. Ch. *Cal.* Perianth inferior, permanent, small, of five unequal, ovate, acute leaves; two of them below the corolla; one above it; and two very large, flat, coloured, like wings, at the sides. *Cor.* imperfectly papilionaceous. Standard tubular, nearly cylindrical, short, its mouth reflexed, small, cloven. Keel concave, compressed, swelling towards the extremity, near to which are attached, for the most part two, feathery, three-cleft appendages. *Stam.* Filaments eight, in two sets, both united, contained within the keel; anthers eight, simple. *Pist.* Germen oblong, superior;

POLYGALA.

superior; style simple, erect; stigma terminal, tumid, cloven. *Peric.* Capsule turbinate, somewhat heart-shaped, compressed, sharp-edged, with two cells and two valves, bursting on each side at the edges, the partition contrary to the valves. *Seeds* solitary, ovate, with a glandular scar.

Obf. Some species are called beardless, because the appendage to their keel is not of a feather-like structure. Linnæus conceived the two wings to belong to the corolla, though he rightly adverted to their situation, which is out of the line of the other petals. Schreber, whom we follow, esteems them a part of the calyx. Real wings are found in the corolla of *P. myrtifolia*.

Eff. Ch. Calyx of five leaves; two of them very large, wing-like, coloured. Capsule inversely heart-shaped, of two cells.

Polygala consists of a number of elegant species, natives of various parts of the globe, for the most part shrubs, of rather a slender habit; many of the rest are herbaceous, and some few of only annual duration. Linnæus has 24 species in his Sp. Pl. ed. 2; the 14th edition of Syst. Veg. contains 38. Willdenow has 76, the discoveries of Thunberg at the Cape having greatly enriched this genus. The whole are disposed in four sections, of which we shall give examples.

SECT. I. *Crested; (the appendage of the keel feathery).* Forty-two species.

P. vulgaris. Common Milkwort. Linn. Sp. Pl. 986. Willd. n. 6. Ait. n. 2. Engl. Bot. t. 76. Fl. Dan. t. 516. (*Polygala*; Ger. Em. 563. f. 3, 4, and 564. f. 5.)—Flowers crested, racemose. Wings of the calyx three-ribbed, obtuse, the length of the corolla, stems herbaceous, simple, procumbent. Leaves linear-lanceolate, rather acute. Common in dry gravelly or chalky pastures throughout Europe, perennial, flowering in summer. This is the only British species, and abounds among short grass, on chalky hills or dry heaths. The stems spread on the ground every way, and are three or four inches long, clothed with numerous, dark-green, smooth, entire leaves, variable in length and breadth. The flowers are usually blue, but frequently pink or white, always veined with green. Their form is singular and elegant, like little flies, and they compose long terminal clusters. The whole herb is very bitter. An infusion of it taken every morning fasting, about a quarter of a pint daily, is good for a catarrhus cough. Most authors believe this the *πολυγυλον* of Dioscorides; others have supposed his plant one of the dwarf *Coronilla*; see Matth. Valgr. v. 2. 549. He speaks of its astringent taste, but says nothing of the great bitterness, so remarkable in our *P. vulgaris*, as well as in its near relations *amara*, *major*, Jacq. Austr. t. 413, and *monspeliaca*. The two following are not among Willdenow's species.

P. venulosa. Sm. Prodr. Fl. Græc. Sibth. n. 1641. Fl. Græc. t. 669, unpublished.—Flowers crested, racemose. Wings of the calyx three-ribbed, copiously veined, shorter than the keel. Stems ascending. Leaves elliptic-lanceolate.—Gathered by Dr. Sibthorp on hills in the island of Cyprus, as well as in the countries of Argos and Laconia, flowering in May. This species is rather larger and more erect than the *vulgaris*, but less than the *major*, differing essentially from both in the great abundance of little transverse green veins, between the three ribs of the broad obovate wings. The flowers are of a pale blush-colour, with a white crest, the petals nearly twice as long as the wings.

P. glumacea. Sm. ibid. n. 1642. Fl. Græc. t. 670, unpublished.—Flowers crested, racemose. Wings of the calyx three-ribbed, slightly veined, twice as long as the

keel. Leaves taper-pointed.—Discovered by Dr. Sibthorp, who named it extemporaneously *P. cypria*, on grassy hills in Cyprus, flowering in May. The abbè Durand gathered the same at Gibraltar. Rather smaller than the foregoing, and conspicuous for the chaffy aspect of the elliptic-lanceolate green and white wings, about twice the length of the snow-white corolla; their transverse green veins are few, and do not reach from rib to rib. The stems are nearly erect. Leaves narrow, and taper-pointed. Partial flower-stalks capillary and purple.

P. paniculata. Linn. Sp. Pl. 987. Willd. n. 17. Swartz Obf. 272. t. 6. f. 2.—Flowers crested. Clusters lateral, on very long stalks. Stem herbaceous, erect, much branched upwards. Leaves linear, acute.—Native of shady hillocks, on the banks of rivers, in Jamaica, Hispaniola, &c. A slender annual species, with a panicled stem, about a foot high, rough with minute glandular pubescence. Leaves copious, smooth, narrow, hardly an inch long. Flower-stalks usually terminal at first, but soon becoming lateral; not axillary, as Willdenow defines them; each bearing a delicate cluster of small pale flowers, with permanent pink wings. Ripe capsule green, elliptical, longer than the wings. Seeds hairy.

P. bracteolata. Spear-leaved Milkwort. Linn. Sp. Pl. 987. Willd. n. 29. Ait. n. 4. Curt. Mag. t. 345.—Flowers crested, racemose. Wings of the calyx many-ribbed, pointed, obliquely ovate. Stem erect, shrubby. Leaves linear-lanceolate, smooth.—This is one of those beautiful Cape species, which contribute so much to the ornament of our more choice greenhouses. It is a smooth branching shrub, three or four feet high, flowering all summer, with usually very narrow linear leaves. Flowers in long terminal clusters, large and very handsome, the wings of the calyx being internally of the most vivid purple or crimson; externally green, veined and tinged with red. Keel green, with a white tufted crest. Each partial stalk is an inch long, with three lanceolate bracteas at the base; but these, as Willdenow remarks, are not peculiar to the present species.

P. myrtifolia. Myrtle-leaved Milkwort. Linn. Sp. Pl. 988. Willd. n. 37. Ait. n. 7. Mill. Illustr. t. 61. (*P. arborea myrtifolia*; Comm. Hort. v. 1. 87. t. 46.)—Flowers crested. Clusters short, terminal. Keel falcate. Stem shrubby. Leaves elliptic-oblong, bluntish, smooth.—Native of the Cape of Good Hope, and one of the first plants from that country introduced into our greenhouses, where it blossoms most part of the year. The leaves vary in breadth, and are sometimes obovate; their colour is a bright yellowish-green. Flowers very elegant; the inner surface of their broad wings light purple; their keel broad and rounded, pale with a rich purple tip; its appendage first three-cleft, then twice subdivided, into capillary, hardly feathery, segments. J. Miller's figure exhibits, besides the diminutive cloven standard, a pair of equally diminutive lanceolate wings to the corolla. Possibly such may be found in other species.

P. oppositifolia. Opposite-leaved Milkwort. Linn. Mant. 259. Willd. n. 39. Ait. n. 8. Curt. Mag. t. 492.—Flowers crested. Clusters short, terminal. Stem shrubby. Leaves opposite, acute, ovate, somewhat heart-shaped.—Native of the Cape; sent to Kew by Mr. Masson in 1790. This species, which vies with the two foregoing in beauty, is distinguished from them by its opposite leaves, and their broad more or less heart-shaped figure. The stem is woody and stout, much branched; the branches often downy. Flowers in short terminal clusters, constructed much like those of *myrtifolia*, but their wings are more acute, and of a less

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a less bright or uniform purple. In this respect however they vary; as do the *leaves* in their shape, which is sometimes much more cordate, as well as pointed; and this variety constitutes the *P. cordifolia* of Linnæus and others. The *stem* being smooth or downy is no permanent distinction.

P. spinosa. Thorny Milkwort. Linn. Sp. Pl. 989. Mant. 437. Willd. n. 42. Ait. n. 10.—Flowers crested, axillary, solitary. Stem shrubby, with thorny-pointed branches. Leaves oval, obtuse, with a small point.—Native of the same country with the three foregoing, but of the time of its introduction here no more is recorded than that Dr. Fothergill cultivated it before the year 1780. Mr. Aiton says it flowers in January and February. The *stem* is very stout and firm, with copious short leafy *branches*, each terminated by a strong rigid spine. *Leaves* numerous, scattered, elliptical, thick, about a quarter of an inch long, on short *stalks*. *Flowers* rather smaller than the *leaves*, white, tipped with purple, drooping, on short stalks, for the most part solitary. We presume there must be some mistake in the marvellous assertion of Linnæus, given on the authority of governor Tulbagh, that the *fruit* of this species is an eatable *berry*. If so, we can only say the plant is no *Polygala*.

SECT. 2. *Beardless; (keel without a feathery appendage).* Stem rather shrubby. Twenty-four species.

P. astuans. Linn. Suppl. 315. Willd. n. 47.—Flowers beardless, racemose. Leaves lanceolate, stalked. Stem shrubby. Capsule ovate, corrugated, woody, sent by Mutis to Linnæus, from New Granada. The *stem* is shrubby, with alternate, striated, minutely downy *branches*. *Leaves* alternate, stalked, elliptic-lanceolate, obtuse with a small point, entire, minutely downy, an inch and a half or two inches long. *Footstalks* short, broad, channelled, downy, glandular as if jointed at the summit. *Clusters* several about the ends of the branches, stalked, downy. *Flowers* of a short round figure. *Wings* of the *calyx* blue. *Keel* white, beardless at the summit, but the inner parts of the flower are downy, and the *keel* itself is lined with silky hairs. *Germs* and *style* smooth. *Capsule* pendulous, smaller than a grain of wheat, ovate, thick and hard, marked with strong elevated reticulations, of two cells, with solitary *seeds*, one of which is sometimes abortive.

P. Chamæbuxus. Box-leaved Milkwort. Linn. Sp. Pl. 989. Willd. n. 53. Ait. n. 11. Schmidel Ic. 75. t. 20. Curt. Mag. t. 316. Jacq. Austr. t. 233. (Anonymos flore Coluteæ; Clus. Hist. v. 1. 105. Chamæbuxus flore Coluteæ; Ger. Em. 1597.)—Flowers beardless, scattered. Keel oblong, with a terminal pouch. Stem rather shrubby, decumbent. Leaves elliptic-lanceolate, acute.—Native of the alps of Germany and Switzerland; tolerably hardy in our gardens, flowering in May and June, and thriving best in a shady border of bog earth. The plant resembles the dwarf box used for edgings, but is conspicuously beautiful when laden with its large white *flowers*, the three-lobed extremity of whose *keel*, at first yellow, soon assumes a rich tawny brown, and finally a paler faded hue, before the *calyx* and its wings are much altered.

P. Heisteria. Furze-leaved Milkwort. Linn. Sp. Pl. 989. Willd. n. 56. Ait. n. 13. Curt. Mag. t. 340. Schneevogt Ic. t. 26. (Heisteria; Linn. Hort. Cliff. 352.)—Flowers beardless, axillary. Leaves awl-shaped, channelled, rough-edged, spinous-pointed, keeled, shorter than the flowers.—Native of the Cape, where it had long been known to the Dutch, but was not sent to England till 1787. The elegant and copious flowers are produced almost all the year long. The *stem* forms a large dense bush; its downy *branches* every where clothed with alternate sessile *leaves*,

half an inch or more in length, smooth except a marginal fringe, and laden with axillary tufts of rather smaller ones. *Flowers* sessile, solitary, longer than the leaves; their *calyx* pale, chaffy, fringed, spinous-tipped; *standard* white; *keel* rounded, of a beautiful purple, with two spreading lobes of the same colour. Some of the reputed varieties in Sp. Pl., copied by Willdenow, are species; the α is *P. stipulacea*, Linn. Mant. 260. Andr. Repos. t. 363?

SECT. 3. *Beardless.* Stem herbaceous, unbranched. Six species.

P. Senega. Rattle-snake Milkwort. Linn. Sp. Pl. 990. Willd. n. 67. Ait. n. 17. Curt. Mag. t. 1051. Woodv. Med. Bot. t. 93. Pursh 464.—Flowers beardless. Cluster terminal, stalked, solitary, tapering. Stem erect, simple, herbaceous. Leaves ovato-lanceolate.—Native of North America, on the sides of hills and in dry woods, flowering from June to August. There is a variety with whitish flowers, in a dense spike or cluster; and another with rose-coloured flowers, in a lax cluster, and narrower leaves. *Pursh.* The *root* is perennial, and somewhat woody, a celebrated Indian remedy for the bite of a rattle-snake, but now discredited. The *stems* are about a foot high, slender, clothed with scattered smoothish *leaves*, about two inches long. *Cluster* pale red, or whitish, not unlike that of a *Polygonum*.

P. lutea. Yellow-flowered Milkwort. Linn. Sp. Pl. 990. Willd. n. 68. Ait. n. 18. Pursh 465. (*P. floridana lutea*, floribus in globosum capitulum congestis; Pluk. Amalth. 175. t. 438. f. 6.)—Flowers beardless. Cluster dense, capitate, terminal. Bractæas setaceous. Stem erect, simple, herbaceous. Leaves lanceolate; the radical ones obovate.—Found in moist shady situations in North America, flowering in July and August. *Root* annual, or biennial. *Stem* slender, straight, leafy, above a foot high. *Leaves* acute, an inch long, tapering at the base. *Flowers* of a fine golden yellow, numerous, in a dense round-headed *cluster*. Mr. Pursh mentions a dwarf variety, in which all the *leaves* are spatulate, and the *cluster* larger.

SECT. 4. *Beardless.* Stem herbaceous, branched. Four species.

P. ciliata. Fringed Milkwort. Linn. Sp. Pl. 991. (*P. n. 268; Linn. Zeyl. 123.*)—Flowers beardless, in slender spikes. Stem herbaceous, branched, erect. Leaves heart-shaped. Capsules fringed with rigid teeth.—Native of the East Indies; a stranger to our gardens, nor does it appear to be any where figured. This is a branched herbaceous annual plant, a span high, the *stem* angular, and somewhat winged. *Leaves* alternate, on short stalks, heart-shaped, not ovato-lanceolate, scarcely an inch long, tipped with a little point, smooth, five-ribbed. *Spikes* long and slender, stalked, terminal; lax when in seed. *Flowers* small, variegated with pink, white, and green, much resembling those of our common Fumitories, but smaller. *Capsules* very curiously formed, abrupt, of two rounded compressed lobes, edged with little rigid obtuse teeth, like those of a clock-wheel.

POLYGALA, in Gardening, contains plants of the woody, under-shrubby, and herbaceous perennial kind, of which the species cultivated are, the myrtle-leaved milk-wort (*P. myrtifolia*;) and the box-leaved milk-wort (*P. chamæbuxus*.)

Method of Culture.—The first sort may be increased by seeds, which should be sown in small pots, filled with light loamy earth; soon after they are ripe, placing them where they may have the morning sun only till October, when they should be placed under a hot-bed frame, and be plunged into old tanners' bark which has lost its heat, where they may be defended from frost during the winter, and in the spring the pots

pots should be plunged into a moderate hot-bed, which will bring up the plants. When these appear, they should not be too tenderly treated, but have a large share of free air admitted to them; when they are fit to transplant, they should be carefully shaken out of the pots, and separated, planting each into a small pot filled with soft loamy earth, and plunged into a very moderate hot-bed, to forward their taking new root, shading them from the sun, and gently refreshing them with water as they may require. When they are rooted, they must be gradually inured to the open air, and in June they may be placed abroad in a sheltered situation, where they may remain till the middle or latter end of October, according as the season proves favourable; then they must be removed into the greenhouse; and treated in the same way as the orange-tree, being careful not to give them too much wet during the winter season.

The second sort was formerly thought difficult to raise by seeds; but at present it is readily increased by parting its creeping roots, and planting them in bog earth, on a shady border, where it thrives very well, and spawns much.

The first sort affords variety when set out among other potted plants of the greenhouse kind; and the latter in the borders, &c.

POLYGAMIA, in *Botany*, from *πολυς*, *many*, and *γαμος*, *a marriage*, the twenty-third class in the Linnæan artificial system, derives its name and character from the various distribution of its stamens and pistils, which are partly found in the same flower, and partly in separate ones, either on the same or on different individual plants of one species. Such a diversity is very prevalent among the trees of tropical climates, which are most of them more or less polygamous, as is the case also with many grasses. Yet such a character, being not always permanent, leads to much difficulty in practice. Hence some botanists have hastily abolished the class altogether. The writer of the present article first suggested a limitation of it to those genera which have a difference of structure in the accessory parts of their flowers, (the calyx, corolla, &c.) independent of the stamens and pistils; flowers so constructed being permanently distinct. If the class cannot be supported on this foundation, it must fall to the ground. *Atriplex* is thus the only British example of *Polygamia*, having some perfect flowers, (with stamens and pistils,) whose calyx is regularly five-cleft and spreading; while on the same plant are others, with pistils only, whose calyx consists of two compressed valves, greatly enlarged as the seed ripens. Yet some species of this very genus have the stamens and pistils separate in all their flowers.

The orders of the class in question are three.

1. *Monoecea*, in which the united, or perfect, flowers are accompanied with male or female, or both, all on the same individual plant, as in *Atriplex*.

2. *Dioecia*, in which the different kinds of flowers grow on two distinct individuals; there being, in that case, only male or only female flowers, besides the united ones, of which *Hippophæ* is but an occasional example. 3. *Trioecia*, having, on three separate individuals, the three different sorts of flowers, male, female, and united. Of this *Ficus* is supposed to be a solitary, and perhaps a very doubtful, example.

POLYGAMIA is the appellation of all the Linnæan orders of *Syngenesia*, (except the now abolished one, *Monogamia*,) having a word subjoined to express the kind of polygamy existing in each order. Thus; 1. *Polygamia equalis* has all the florets, in the common calyx, perfect or united, each furnished with its own efficient stamens and pistil: 2. *Polygamia superflua* has perfect florets in the disk, female ones,

equally fertile, in the circumference: 3. *Polygamia frustranea* has perfect florets in the disk, and neutral or abortive ones in the circumference: 4. *Polygamia necessaria* has male florets in the disk, female in the circumference: and lastly, 5. *Polygamia segregata* has several syngenesious flowers, with a partial calyx, all united in one general calyx, as in *Echinops*, the Globe-thistle. Willdenow has, very unadvisedly, omitted the word *polygamia* in the class *Syngenesia*, terming the orders simply *equalis*, *superflua*, &c.; adjectives, having no substantive with which they can agree but *Syngenesia*, and therefore conveying a wrong idea. We are happy to observe that the able author and editor of Hort. Kew. have not been seduced by him in this instance.

POLYGAMY, *Πολυγαμία*, formed from *πολυς*, *multus*, and *γυνή*, *uxor*, *wife*; a plurality of wives, or husbands, held by the same man, or woman, at the same time.

Polygamy is prohibited among Christians; but it was allowed among the Jews, as it is still among the Mahometans; and under all the religions that have obtained in Asia. In the kingdoms of Boutan and Thibet, polygamy is at this time almost general; one wife frequently serving all the males of a whole family, without being the cause of any uncommon disunion or jealousy among them.

The customs of the Sumatrans, as we learn from Mr. Marsden (*Hist. of Sumatra*), permit their having as many wives by "joojoo," as they can afford to purchase or maintain. "Joojoo" is a certain sum of money, given by one man to another, as a consideration for the person of his daughter, whose situation, in this case, differs not much from that of a slave to the man she marries, and to his family. Nevertheless, in Sumatra it is extremely rare, that an instance occurs of their having more than one, and that only among a few of the chiefs, which continence is in some measure owing to their poverty. In talking of polygamy, they allow it to be the privilege of the rich, but they regard it as a refinement to which the poor Rejangs cannot pretend. A man married by "semundo," or by a regular treaty between the parties on the footing of equality, cannot take a second wife without repudiating the first, for this obvious reason, that two or more persons would not be equally entitled to the half of his effects.

Montesquieu infers, that the law which permits polygamy, is physically conformable to the climate of Asia. The season of female beauty precedes that of their reason, and from its prematurity soon decays. The empire of their charms is short. It is therefore natural, as he observes, that a man should leave one wife to take another; that he should seek a renovation of those charms that had withered in his possession. But are these the real circumstances of polygamy? Mr. Marsden says, surely not. It implies the contemporary enjoyment of women in the same predicament; and he adds, I should consider it as a vice, that has its source in the influence of a warm atmosphere upon the passions of men, which, like the cravings of other disordered appetites, make them miscalculate their wants. Moreover, it ought to be considered, that the genial warmth which expands the desires of the men, and prompts a more unlimited exertion of their faculties, does not inspire their constitutions with proportionate vigour; but, on the contrary, renders them, in this respect, inferior to the inhabitants of the temperate zone; whilst it equally influences the desires of the opposite sex, without being found to diminish from their capacity of enjoyment. Whence we may infer, that if nature intended one woman only should be the companion of one man in the colder regions of the earth, it appears also intended, *a fortiori*, that the same law should be observed in the hotter; inferring nature's design, not from

the desires, but from the abilities with which she has endowed mankind.

Montesquieu has farther suggested, that the inequality in the comparative numbers of each sex, born in Asia, which is represented to be greatly superior on the female side, may have relation to the law that allows polygamy. But it is replied, that there is strong reason for denying the reality of this supposed excess. The Japan account, taken from Kæmpfer, which makes them to be in the proportion of 22 to 18, is very inconclusive, as the enumeration of the inhabitants of a great city can furnish no proper test; and the account of births at Bantam, which states the number of girls to be ten to one boy, is not only manifestly absurd, but positively false. Marsden asserts, with confidence, that the proportion of the sexes throughout Sumatra does not sensibly differ from that ascertained in Europe; nor could he ever learn from the inhabitants of the many eastern islands with whom he had an opportunity of conversing, that they were conscious of any disproportion in this respect.

But from whatever source we derive polygamy, its prevalence is attended with the practice of giving a valuable consideration for the female, instead of receiving a dowry with her. Where each man endeavours to engross several, the demand for the commodity, as a merchant would express it, is increased, and the price of course enhanced. In Europe the demand is small, whether owing to the paucity of males from continued diminution, their coldness of constitution, their corruption of manners, leading to promiscuous concubinage, or, in fine, the extravagant luxury of the times, which renders a family an insupportable burden;—whatever may be the cause, it becomes necessary, in order to counteract it, and produce an additional incitement to the marriage state, that a premium be given with the females. We find in the history of the earliest ages of the world, that when a plurality of women were allowed, by law or custom, they were obtained by money or service. The form of marriage by “Semundo,” among the Malays, which admits but of one partner, requires no sum to be paid by the husband to the relations of the wife, except a trifle, by way of token, or to defray the expences of the wedding feast. The custom of giving “joojoors” had most probably its foundation in polygamy; and the superstructure subsists, though its basis is partly mouldered away; but being scarcely tenable, the inhabitants are inclined to quit, and suffer it to fall to the ground. Moderation with regard to women destroying their principle, the “joojoors” appear to be devoid of policy. Open a new spring of luxury, and polygamy, now confined to a few individuals among the chiefs, will spread throughout the people. Beauty will be in high request; each fair one will be fought for by many competitors; and the payment of the “joojoor” be again esteemed a reasonable equivalent for possession. Their acknowledgment that the custom, under the present circumstances, is a prejudicial one, so contrary to the spirit of eastern manners, which is ever marked with a blind veneration for the establishments of antiquity, contributes to strengthen considerably the opinion already advanced.

Major Graunt observes, that the males and females brought into the world are nearly on a balance, only abating for a little excess on the side of the males, in the proportion of about 19 to 18, to make up for the extraordinary expence thereof in war, and at sea: whence it evidently follows, that nature only intends one wife, or one husband, for the same person; since, if they have more, some others must go without any at all. See MARRIAGE.

Hence he concludes, that the Christian law, which prohibits polygamy, is more agreeable to the law of nature

than the Mahometan; and we may add, than the Jewish law, which tolerated polygamy.

Dr. Percival, Phil. Transf. vol. lxvi. part i. p. 163. has very justly observed, that the practice is brutal, destructive to friendship and moral sentiment, inconsistent with one great end of marriage, the education of children, and subversive of the natural rights of more than half of the species: besides, it is injurious to population, and, therefore, can never be countenanced or allowed in a well regulated state; for, though the number of females in the world may considerably exceed the number of males, yet there are more men capable of propagating their species than women capable of bearing children; and it is a well known fact that Armenia, in which a plurality of wives is not allowed, abounds more with inhabitants than any other province of the Turkish empire.

Yet Selden has proved, in his “Uxor Hebraica,” that plurality of wives was allowed of, not only among the Hebrews, but also among all other nations, and in all ages. It is true, the ancient Romans were more severe in their morals, and never practised it, though it was not forbidden among them: and Mark Antony is mentioned as the first who took the liberty of having two wives.

From that time it became pretty frequent in the empire, till the reigns of Theodosius, Honorius, and Arcadius, who first prohibited it by an express law in 393. After this the emperor Valentinian, by an edict, permitted all the subjects of the empire, if they pleased, to marry several wives: nor does it appear, from the ecclesiastical history of those times, that the bishops made any opposition to this introduction of polygamy. In effect there are some even among the Christian casuists, who do not look on polygamy as in itself criminal. Jurieu observes, that the prohibition of polygamy is a positive law; but from which a man may be exempted by sovereign necessity. Baillet adds, that the example of the patriarchs is a very powerful argument in favour of polygamy.

But though the practice of polygamy prevailed among the patriarchs, both before and under the Jewish law, it has been doubted whether the law of Moses permitted it. (See Deut. xvii. 16. xxi. 15.) The permission, if there was any, might be like that of divorce, “for the hardness of their heart,” in condescension to their established indulgencies rather than from the general rectitude or propriety of the thing itself. However this be, the state of manners in Judea had probably undergone a reformation in this respect before the time of Christ, for in the New Testament we meet with no trace or mention of any such practice being tolerated. For this reason, and because it was likewise forbidden among the Greeks and Romans, we cannot expect to find any express law upon the subject in the Christian code.

The ancient Medes compelled their citizens, in one canton, to take seven wives; in another, each woman to receive five husbands; according as war had made, in one quarter of their country, an extraordinary havock among the men, or the women had been carried away by an enemy from another. This regulation, so far as it was adapted to the proportion which subsisted between the numbers of males and females, was founded in the reason upon which the most improved nations of Europe proceed at present.

Among the ancient Britons they had a singular kind of marriage, or rather polygamy, which is not to be found among any other people. Any number of them, as ten or a dozen, joined in a society together, which was perhaps requisite for mutual defence in those barbarous times. In order to link this society the closer, they took an equal number of wives in common, and whatever children were

born, were reputed to belong to all of them, and were accordingly provided for by the whole community.

Cæsar found among the inhabitants of this island a species of polygamy, if it may be so called, which was perfectly singular. "Uxores," says he, "habent deni duodenique inter se communes, et maxime fratres cum fratribus, parentisque cum liberis: sed si qui sunt ex his nati, eorum habentur liberi, quæ primum virgo quæque deducta est."

It has been much disputed among the doctors of the civil law, whether polygamy be adultery. In the Roman law it is called *stuprum*, and punished as such, that is, in some cases, capitally. But a smaller punishment is more consistent with the Jewish law, wherein the prohibition of adultery is perpetual, but that of polygamy temporary only. See Selden, lib. i. cap. 9. de Uxore Hebraica.

The words of Christ (Matt. xix. 9.), may be construed, says archdeacon Paley, by an easy explication to prohibit polygamy; for, if "whoever putteth away his wife, and marrieth another, committeth adultery," he who marrieth another, *without* putting away the first, is no less guilty of adultery; because the adultery does not consist in the repudiation of the first wife (for however unjust or cruel that may be, it is not adultery), but in entering into a second marriage, during the legal existence and obligation of the first.

However this passage be understood, polygamy has been as much disused and as universally prohibited in all Christian countries, as if Christianity had positively and expressly forbidden it.

In Germany, Holland, and Spain, this offence is differently punished. By a constitution of Charles V. it was a capital crime. By the laws of ancient and modern Sweden it is punished with death. In Scotland it is punished as perjury.

In England it is enacted by statute 1 Jac. I. cap. 11. that if any person, being married, do afterwards marry again, the former husband or wife being alive, it is felony, but within the benefit of clergy. The first wife in this case shall not be admitted as an evidence against her husband, because she is the true wife; but the second may, for she is indeed no wife at all; and so *vice versa* of a second husband. This act makes an exception to five cases, in which such second marriage, though in the three first it is void, is, however, no felony. 1. Where either party hath been continually abroad for seven years, whether the party in England had notice of the other's being living or no. 2. Where either of the parties hath been absent from the other seven years, within this kingdom, and the remaining party hath had no notice of the other's being alive within that time. 3. Where there is a divorce or separation *a mensa et thoro* by sentence in the ecclesiastical court. 4. Where the first marriage is declared absolutely void by any such sentence, and the parties loosed *a vinculo*. Or, 5. Where either of the parties was under the age of consent at the time of the first marriage; for in such case the first marriage was voidable by the disagreement of either party, which this second marriage very clearly amounts to. But if at the age of consent the parties had agreed to the marriage, which completes the contract, and is, indeed, the real marriage, and afterwards one of them should marry again, judge Blackstone apprehends that such second marriage would be within the reason and penalties of the act. Comment. book iv.

Bernardus Ochinus, general of the order of Capuchins, and afterwards a Protestant, published, about the middle of the sixteenth century, Dialogues in favour of polygamy,

which were answered by Theodore Beza. And about the conclusion of the last century we had at London an artful treatise published in behalf of a plurality of wives, under the title of "Polygamia Triumphatrix:" the author of which assumes the name of Theophilus Aletheus; but his true name was Lyferus: he was a native of Saxony. It has been answered by several.

In the year 1780, the Rev. Mr. Madan published a treatise, artfully vindicating and strongly recommending polygamy, under the title of "Thelyphthora; or a Treatise on Female Ruin, in its Causes, Effects, Consequences, Prevention, and Remedy, &c." Marriage, according to this writer, simply and wholly consists in the act of personal union, or *actus coitus*. Adultery, he says, is never used in the sacred writings but to denote the defilement of a betrothed or married woman, and to this sense he restricts the use of the term, so that a married man, in his opinion, is no adulterer, if his commerce with the sex be confined to single women, who are under no obligations by espousals or marriage to other men: but, on the other hand, the woman who should dare to have even but once an intrigue with any other man besides her husband, (let him have as many wives as Solomon,) would, *ipso facto*, be an adulteress, and ought, together with her gallant, to be punished with immediate death. This, he boldly says, is the law of God: and on this foundation he limits the privilege of polygamy to the man; in support of which he refers to the polygamous connections of the patriarchs and saints of the Old Testament, and infers the lawfulness of their practice from the blessings which attended it, and the laws which were instituted to regulate and superintend it. He contends for the lawfulness of Christians having, like the ancient Jews, more wives than one; and labours much to reconcile the genius of the evangelical dispensation to an arrangement of this sort. With this view he asserts, that there is not one text in the New Testament that even hints at the criminality of a polygamous connection; and he would infer from St. Paul's direction, that bishops and deacons should have but one wife, that it was lawful for laymen to have more. Christ, he says, was not the giver of a new law: but the business of marriage, polygamy, &c. had been settled before his appearance in the world, by an authority which could not be revoked. Besides, this writer not only thinks polygamy lawful in a religious, but advantageous in a civil light, and highly politic in a domestic view.

In defence of his notion of marriage, which, according to his account of it, consists in the union of man and woman as one body, the effects of which in the sight of God no outward forms or ceremonies of man's invention can add to or detract from, he grounds his principal argument on the Hebrew words made use of in Gen. ii. 24. to express the primitive institution of marriage, *viz.* בָּשָׂר וָחַיִּים, rendered by the LXX *προσκολληθησονται προς την συνικια αυτην*, which translation is adopted by the evangelist (Matt. xix. 5.) with the omission only of the superfluous preposition (*προς*) after the verb. Our translation, he says, "shall cleave to his wife," doth not convey the idea of the Hebrew, which is literally, as Montanus renders the words, "shall be joined or cemented *in* his woman, and they shall become (*i. e.* by this union) one flesh." But on this criticism, it is well remarked, that both the Hebrew and Greek terms mean simply and literally attachment or adherence; and are evidently made use of in the sacred writings to express the whole scope of conjugal fidelity and duty, though he would restrain them to the grosser part of it. See Deut. iv. 4. Joshua, xxiii. 8. Acts, v. 36.

With respect to the Mosaic law, for which Mr. Madan is a warm advocate, it was certainly a local and temporary institution, adapted to the ends for which it was appointed, and admirably calculated, in its relation to marriage, to maintain and perpetuate the separation of the Jewish people from the Gentiles. In attempting to depreciate the outward forms of marriage, this writer would make his readers believe, that because none are explicitly described, therefore none existed: and, consequently, that they are the superfluous ordinances of human policy. But it is evident, from comparing Ruth, iv. 10, 13. with Tobit, vii. 13, 14. and from the case of Dinah, related Gen. ch. xxxiv. that some forms were deemed essential to an honourable alliance by the patriarchs and saints under the Old Testament, exclusive of the carnal knowledge of each other's persons. It is also evident in the case of the woman of Samaria, whose connection with a man not her husband is mentioned in John iv. that something besides cohabitation is necessary to constitute marriage in the sight of God.

Having stated his notion of marriage, he urges in defence of polygamy, that notwithstanding the seventh commandment, it was allowed by God himself, who made laws for the regulation of it, wrought miracles in support of it by making the barren woman fruitful, and declared the issue legitimate to all intents and purposes. God's allowance of polygamy is argued from Exod. xxi. 10, and particularly from Deut. xxi. 15, which, he says, amounts to a demonstration. This passage, however, at the utmost, only presupposes that the practice might have existence among so hard-hearted and fickle a people as the Jews; and therefore wisely provides against some of its more unjust and pernicious consequences; such as tended to affect the rights and privileges of heirship. Laws enacted to regulate it cannot be fairly urged in proof of its lawfulness on the author's own hypothesis; because laws were also made to regulate divorce, which Mr. Madan condemns as absolutely unlawful, except in cases of adultery. Besides, it is more probable, that the "hated wife" had been dismissed by a bill of divorcement, than that she was retained by her husband: and moreover, it is not certain that the two wives, so far from living with the same husband at the same time, might not be dead; for the words may be rendered thus, "if there should have been to a man two wives, &c." The words expressing the original institution of marriage, Gen. ii. 24. compared with Matt. xix. 4, 5, 8, afford insuperable objections against Mr. Madan's doctrine of polygamy. (See also Lev. xviii. 18. 1 Cor. vii. 2, &c.) In a word, the several passages in St. Paul's writings, which speak of marriage, always suppose it to signify the union of one man with one woman. See Rom. vii. 2, 3.

If we appeal on this subject, from the authority of scripture to the writings of some of the earliest fathers in the Christian church, there is not to be found the faintest trace of any thing resembling a testimony to the lawfulness of polygamy; on the contrary, many passages occur, in which the practice of it is strongly and explicitly condemned. See Justin Martyr's Dial. with Trypho the Jew, Greek edit. by Thirlby, fol. p. 336. 423. 372. Clemens Alexandrin. Stromata, lib. iv. p. 312, 335, 336, edit. Heinsii, &c. Lug. Bat. fol. 1616.

We shall here adopt the words of an excellent anonymous writer, to whose critique on Mr. Madan's work we are indebted for many of the above remarks: in a word, when we reflect, that the primitive institution of marriage limited it to one man and one woman; that this institution was adhered to by Noah and his sons, amidst the degeneracy of the age in which they lived, and in spite of the examples

of polygamy, which the accursed race of Cain had introduced; when we consider how very few (comparatively speaking) the examples of this practice were among the faithful; how much it brought its own punishment with it; and how dubious and equivocal those passages are in which it appears to have the sanction of divine approbation; when to these reflections we add another, respecting the limited views and temporary nature of the more ancient dispensations and institutions of religion—how often the imperfections, and even vices of the patriarchs, and people of God, in old time, are recorded, without any express notification of their criminality—how much is said to be commanded, which our reverence for the holiness of God, and his law, will only suffer us to suppose was, for wise ends, permitted—how frequently the messengers of God adapted themselves to the genius of the people to whom they were sent, and the circumstances of the times in which they lived; above all, when we consider the purity, equity, and benevolence of the Christian law; the explicit declarations of our Lord, and his apostle St. Paul, respecting the institution of marriage, its design and limitation; when we reflect, too, on the testimony of the most ancient fathers, who could not possibly be ignorant of the general and common practice of the apostolic church; and, finally, when to these considerations we add those which are founded on justice to the female sex, and all the regulations of domestic economy and national policy, we must wholly condemn the revival of polygamy; and thus bear our honest testimony against the leading design of this dangerous and ill-advised publication. Monthly Review, vol. lxxiii. p. 338.

Polygamy, says Paley, not only violates the constitution of nature, and the apparent design of the Deity, but produces to the parties themselves, and to the public, the following bad effects: contests and jealousies amongst the wives of the same husband; distracted affections, or the loss of all affection in the husband himself; a voluptuousness in the rich, which dissolves the vigour of their intellectual as well as active faculties, producing that indolence and imbecility both of mind and body, which have long characterised the nations of the East; the abasement of one half of the human species, who, in countries where polygamy obtains, are degraded into mere instruments of physical pleasure to the other half; neglect of children; and the manifold, and sometimes unnatural, mischiefs, which arise from the scarcity of women. To compensate for these evils, polygamy does not offer a single advantage. In the article of population, which it has been thought to promote, the community gains nothing, that is, nothing compared with a state in which marriage is nearly universal; for the question is not, whether one man will have more children by five or more wives than by one, but whether these five wives would not have the same, or a greater number of children, by five separate husbands. And as to the care of the children when produced, and the sending of them into the world in situations, in which they may be likely to form and bring up families of their own, upon which the increase and succession of the human species in a great degree depend; this is less provided for, and less practicable, where twenty or thirty children are to be supported by the attention and fortune of one father, than if they were divided into five or six families, to each of which were assigned the industry and inheritance of two parents. Paley's Principles of Moral and Political Philosophy, vol. i.

POLYGAMY is also used in the *Canon Law*, for a plurality of wives, though only had successively, or one at a time: in the Romish church this disqualifies a man for the episcopate. See BIGAMY.

POLYGLOTT, Πολυγλωττος, thus called from πολυ, and γλωττιζ, tongue, language, among *Divines* and *Critics*, chiefly denotes a bible printed in several languages.

The first Polyglott bible is that of cardinal Ximenes, printed in 1515, at Alcalá de Henares; and commonly called the *Bible of Complutum*, or the *Complutensian Bible*; and contained in six volumes.

It contains the Hebrew text, the Chaldee paraphrase on the Pentateuch, the Greek version of the LXX, and the ancient Latin version.

In this Polyglott there is no other Latin version from the Hebrew, beside this last; but there is added another literal one from the Greek Septuagint. The Greek text of the New Testament is here printed, without accents, to bring it nearer to the original of the apostles, or, at least, to the most ancient copies; in which there are no accents found.

At the end is added an apparatus of grammars, dictionaries, and indices, or tables. The chief author, Ximenes de Cineros, cardinal, and archbishop of Toledo, in his dedication to pope Leo X., observes, that it was necessary to give the holy scriptures in their originals, there being no translation, how good soever, that can render them perfectly.

The second Polyglott, called the *Biblia regia*, is that of Philip II., printed by Plantin, at Antwerp, in 1751, in eight volumes, with a better paper and letter than the former, and the care of the edition imposed on Arias Montanus.

In this, besides every thing in the bible of Complutum, there are added, the Chaldee paraphrases on the rest of the Old Testament, besides the Pentateuch, with a Latin translation of those paraphrases. In this Polyglott is likewise a very literal Latin version of the Hebrew text, for the use of those who have a mind to learn the Hebrew language.

As to the New Testament, beside the Greek and Latin of the bible of Alcalá, in this edition there is added an ancient Syriac version, both in Syriac and Hebrew characters, with points, to facilitate the reading thereof to those accustomed to read Hebrew. To the Syriac is likewise added a Latin one, composed by Guy le Fevre, who had the care of the Syriac version of the New Testament.

Lastly, in the Polyglott of Antwerp is added a more copious apparatus of grammars, dictionaries, &c. than in that of Complutum; with several little treatises, judged necessary for clearing up the more difficult passages in the text.

The third Polyglott is that of M. le Jay, printed at Paris in 1645, in ten volumes, which has this advantage over that of Philip II., that it has the Syriac and Arabic versions of the Old Testament, with Latin interpretations. In the Pentateuch it has likewise the Hebrew and Samaritan text; and the Samaritan version in Samaritan characters.

As to the New Testament, beside every thing in the Polyglott of Antwerp, here is added an Arabic translation, with a Latin interpretation. But here are wanting the apparatus, and the grammars and dictionaries, which are both in the former Polyglotts; which renders this great work very imperfect.

The fourth Polyglott is that of London, printed in 1657, in six volumes, called Walton's Polyglott, from the author of the edition, Dr. Bryant Walton, afterwards bishop of Winchester.

This is, indeed, less magnificent than that of M. le Jay, with regard both to the size of the paper, and the beauty

of the characters; but is, in all other respects, preferable; being both much more ample and more commodious.

In this the Vulgate is printed according to the revised and corrected edition of Clement VIII., which is not done in that of Paris, where the Vulgate is printed as it stands in that of Antwerp, before that correction.

This likewise contains an interlineary Latin version of the Hebrew text; whereas the Paris edition has no other Latin version from the Hebrew beside the common Vulgate: again, the Greek Septuagint printed in the Polyglott is not the same with that printed in the bible of Complutum, which was retained in the editions of Antwerp and Paris, but the Greek text of the edition of Rome. To which are added the various readings of another very ancient Greek copy, called the *Alexandrian*, because brought from Alexandria.

The Latin version of the Greek of the Septuagint is that published by Flaminius Nobilius, by authority of pope Sixtus V. Add, that in this Polyglott are found some parts of the bible in the Ethiopic and Persian; nothing of which appears in any of the rest.

Lastly, this edition has the advantage of preliminary discourses, called prolegomena, on the texts, both of the originals and versions; with a volume of various readings of all the different editions.

Dr. Edmund Castell, Arabic professor at Cambridge, in 1669, published a *Lexicon Heptaglotton*, for the use of Walton's Polyglott, in two volumes, folio. See the Preface to this Polyglott.

To the number of the Polyglotts may likewise be added the two Pentateuchs, printed by the Jews of Constantinople, in four languages; but all in Hebrew characters. In one of these Pentateuchs, printed in 1551, is found the Hebrew text, in large characters; on one side of which is the Chaldee paraphrase of Onkelos, in middling characters; and on the other side, a paraphrase in the Persian, composed by a Jew, one Jacob de Tous, so called from the city where he lived. Beside these three columns, the Arabic paraphrase of Saadias Gaon is printed in small characters, at the top of the pages; and at the bottom is added the commentary of Rasch.

The other Polyglott was printed at Constantinople in 1547, in three columns like the former. The Hebrew text of the law is in the middle, a translation into the vulgar Greek on one side, and a Spanish translation on the other. These versions are both in Hebrew characters, with points to determine the pronunciation. At the top of the page is added the Chaldee paraphrase of Onkelos, and at the bottom the commentaries of Rasch.

To all these may be added, as a seventh Polyglott, the *Pfalter* published by Aug. Justinian, a Dominican, and bishop of Nebio, at Genoa, 1515, containing the Hebrew, Greek, Arabic, and Chaldee, with Latin interpretations and glosses.

There are also various other editions of the bible, either in whole, or in part, which might be ranged under the article of Polyglotts; though they are not so denominated. Such are the *Hexapla*, and *Octapla*, of Origen.

And the bible of Hutter, printed at Hamburg in Hebrew, Chaldee, Greek, Latin, German, Saxon, Italian, French, Sclavonic, Danish, &c.

POLYGLOTTA AVIS, in *Ornithology*, the name of a bird described by Nieremberg, and which, he says, he saw and heard, with admiration, singing in all tones. It is of the size of our starling.

Its back is brown, and its breast and belly white; and
near

near the neck and tail it is variegated with spots and streaks of white; its head has a streak of white, which represents a sort of crown of silver; it is mightily esteemed, and kept in cages by the Spaniards, as infinitely superior to all other birds in melody; it feeds on almost any thing that is given it, and is most fond of the warmer climates; but endures the more temperate ones without harm. Ray.

The polyglottus of Linnæus is a species of the *turdus*; which see.

POLYGON, Πολυγωνος, formed from πολυς, many, and γωνια, angle, in *Geometry*, a multilateral figure, or a figure whose perimeter consists of more than four sides and angles.

If the sides and angles be equal, the figure is called a regular polygon. For similar polygons, see SIMILAR.

Polygons are distinguished according to the number of their sides. Those of five sides are called *pentagons*; those of six, *hexagons*; those of seven, *heptagons*; those of eight, *octagons*, &c. The particular properties, &c. of each of which, see under its proper article, **PENTAGON**, **HEXAGON**, &c.

POLYGONS, general Properties of. Euclid demonstrates these which follow: 1. That every polygon may be divided into as many triangles as it hath sides.

This is done by assuming a point, as F (*Plate XI. Geometry, fig. 6.*), any where within the polygon, and thence drawing lines to every angle, F a, F b, F c, F d, &c.

2. The angles of any polygon, taken together, make twice as many right ones, abating four, as the figure hath sides. Thus, if the polygon hath five sides, the double of that is 10; whence subtracting 4, there remain 6 right ones.

3. Every polygon, circumscribed about a circle, is equal to a right-angled triangle, one of whose legs is the radius of the circle, and the other the perimeter, or sum of all the sides of the polygon.

Hence, every regular polygon is equal to a right-angled triangle, one of whose legs is the perimeter of the polygon; and the other a perpendicular drawn from the centre to one of the sides of the polygon.

Hence, also, every polygon, circumscribed about a circle, is bigger than it; and every polygon, inscribed, is less than the circle. The same likewise appears hence, that the thing containing is ever greater than the thing contained. Hence, again, the perimeter of every polygon circumscribed about a circle, is greater than the circumference of that circle; and the perimeter of every polygon inscribed, less: whence it follows, that a circle is equal to a right-angled triangle, whose base is the circumference of the circle, and its height the radius; since this triangle is less than any polygon circumscribed, and greater than any inscribed.

Nothing, therefore, is wanting to the quadrature of the circle, but to find a right line equal to the circumference of a circle.

POLYGON, to find the area of a regular. Multiply a side of the polygon, as A B, by half the number of the sides, *e. gr.* the side of a pentagon by $2\frac{1}{2}$. Again, multiply the product by a perpendicular let fall from the centre of the circumscribed circle to the side A B; the product is the area required.

Thus, suppose A B 54; and half the number of sides $2\frac{1}{2}$; the product or semiperimeter is 135. Supposing then the perpendicular F H 29; the product of these two, 3915, is the area of the pentagon required.

POLYGON, to find the area of an irregular, or trapezium. Resolve it into triangles; find the several areas of the several

triangles, see TRIANGLE. The sum of these is the area of the polygon required.

POLYGON, to find the sum of all the angles in any. Multiply the number of sides by 180° : from the product subtract 360; the remainder is the sum required.

Thus, in a pentagon, 180, being multiplied by 5, gives 900; whence subtracting 360, there remain 540, the sum of the angles of a pentagon.

Hence, if the sum found be divided by the number of sides, the quotient will be the angle of a regular polygon. Or the sum of the angles is more speedily found thus: multiply 180 by a number less by two than the number of sides of the polygon; the product is the quantity of the angles required: thus, in a pentagon, 180 being multiplied by 3, a number less by two than of its sides, the product is 540, the quantity of angles as before.

The following table exhibits the sums of the angles in all rectilinear figures, from a triangle to a dodecagon; and is of good use, both for the describing of regular figures, and for proving whether or not the quantity of angles has been truly taken with an instrument.

Number of Sides.	Sums of the Angles.	Angles of Regular Figures.	Angles at the Centre.	
III.	180°	60°	100°	
IV.	360	90	90	
V.	540	108	72	
VI.	720	120	60	
VII.	900	128	51	$35\frac{5}{7}$
VIII.	1080	135	45	
IX.	1260	140	40	
X.	1440	144	36	
XI.	1620	147	32	$43\frac{7}{11}$
XII.	1800	150	30	

This table is formed by dividing 360, the degrees in a circumference, by the number of the sides in each polygon; and the quotients are the angles at the centres; the angle at the centre subtracted from 180° leaves the angle at the circumference; and the sum of the angles is had by doubling the number of sides, subtracting 4 from the product, and multiplying the remainder by 90.

POLYGON, to inscribe a regular, in a circle. Divide 360 by the number of sides in the polygon required, to find the quantity of the angle E F D. Set off the angle at the centre, and apply the chord thereof, E D, to the periphery, as often as it will go. Thus will the polygon be inscribed in the circle.

The resolution of this problem, though it be mechanical, yet is not to be despised, because both easy and universal. Euclid, indeed, gives us the construction of the pentagon, decagon, and quindecagon; and other authors give us those of the heptagon, enneagon, and hendecagon; but they are far from geometrical strictness.

Renaldinus lays down a Catholic rule for the describing of all polygons, which many other geometricians have borrowed from him; but Wagnerus and Wolfius have both demonstrated the falsity of it.

POLYGON, about a regular, to circumscribe a circle: or, to circumscribe a regular polygon about a circle. Bisect two of the angles of the given polygon A and E, by the right lines A F and E F, concurring in F, and from the point of concurrence with the radius E F describe a circle. To circumscribe a polygon, &c. divide 360 by the number of sides required,

POLYGON.

required, to find $e F d$; which set off from the centre F , and draw the line $e d$; on this construct the polygon, as in the following problem. See CIRCUMSCRIBING.

POLYGON, on a given line $E D$ to describe any given regular. Find an angle of the polygon in the table; and in E set off an angle equal to it, drawing $E A = E D$. Through the three points A, E, D , describe a circle. In this apply the given right line as often as it will go. Thus will the required figure be described.

POLYGON, to inscribe, or circumscribe a regular, trigonometrically. Find the sine of the arc produced by dividing the semi-periphery 180 by the number of sides of the polygon: the double of this is the chord of the double arc; and therefore the side $A E$ to be inscribed in the circle. If, then, the radius of a circle wherein, *e. gr.* a pentagon is to be inscribed, be given in any certain measure, *e. gr.* 345 , the side of the pentagon is found in the same measure by the rule of three, thus; as radius 1000 is to 1176 , so is 3450 to 4057 , the side of the pentagon. With the given radius, therefore, describe a circle; and therein set off the side of the polygon as often as it will go; thus will a polygon be inscribed in the circle.

To save the trouble of finding the ratio of the side of the polygon to radius, by the canon of sines; we shall add a table expressing the sides of polygons in such parts whereof radius contains 10000000 . In practice, as many figures are cut off from the right hand, as the circumstance of the case render needless.

Number of Sides.	Quantity of Sides.	Number of Sides.	Quantity of Sides.
III.	17320508	VIII.	7653668
IV.	14142135	IX.	6840402
V.	11755705	X.	6180339
VI.	10000000	XI.	5634651
VII.	8677674	XII.	5176380

POLYGON, to describe a regular, on a given right line, and to circumscribe a circle about a given polygon, trigonometrically. Taking the ratio of the side to the radius out of the table, find the radius in the same measure in which the side is given. For the side and radius being had, a polygon may be described by the last problem. And if with the interval of the radius, arcs be struck from the two extremes of the given line, the point of intersection will be the centre of the circumscribing circle.

General analytical Investigation of the Properties of Polygons.—The most curious property of polygons is that discovered by professor Gauss, of Straßburgh, and published by him in his “*Disquisitiones Arithmeticae*” in the year 1800 . This is one of the most interesting theorems of the kind that has been discovered since that of the celebrated Cotesian theorem, and our readers, therefore, will be gratified to find here a sketch of the method which this author has pursued.

We have given above, and under the articles TRIANGLE and SQUARE, the geometrical method of inscribing in a circle a triangle, square, and pentagon: and from these it is obvious, that we may also inscribe any polygon of $6, 12, 24, \&c.$ sides, as also of $8, 16, 32, \&c.$, and of $10, 20, 40, \&c.$ sides, by the continual bisection of the arcs subtending the side of the original figure. It is also evident from other principles, that if two polygons of an unequal number of sides prime to each other can be inscribed in a circle, that the polygon whose number of sides is equal to the product of these, may likewise be inscribed

geometrically; therefore, 3 and 5 being numbers of this kind, we see that a 15 -sided polygon may be inscribed, and consequently one of $30, 60, 120, \&c.$ sides, and these were the only cases whose geometrical constructions were known before the publication of the work above-mentioned. But Mr. Gauss has added to them several others, having shewn how any polygon of a prime number of sides may be inscribed when that prime number is of the form $2^m + 1$; such are the numbers $17, 257, \text{ and } 65537$, and consequently their doubles, quadruples, &c.

Gauss's Theorem for Polygons.—It is obvious, that when the cosine or sine of the central angle of a polygon can be analytically expressed by means of quadratic equations, the same polygon may be geometrically inscribed; but when the sine or cosine cannot be expressed without a higher equation than a quadratic, as there are no geometrical constructions of such equations, no more are there any geometrical construction of the polygons depending upon them; therefore, when the former can be accomplished, the possibility of the construction is admitted, and this is what is to be understood by *Gauss's theorem*, which is a general method of exhibiting the sides of every polygon in the lowest analytical expression, which in the cases above mentioned are simple quadratics.

It has been known, since the invention of the Cotesian theorem, that the division of the circle into any proposed number of parts depends upon the solution of the general binomial equation $x^n + 1 = 0$, all the imaginary roots of the former, *viz.* of $x^n + 1 = 0$, being contained in the general

formula $x^2 - 2 \cos. \frac{(2k+1)\pi}{n} x + 1 = 0$; and of the latter,

viz. $x^n - 1 = 0$, in the general formula $x^2 - 2 \cos. \frac{2k\pi}{n} x + 1$

$= 0$, k being any integer number not divisible by n , and π representing the semi-circumference. See the demonstrations of these properties in Lagrange's *Leçons des Fonctions Analytiques*, or in Barlow's *Theory of Numbers*, p. 481 .

Assuming, therefore, the equation $x^n - 1 = 0$, and its general factor $x^2 - 2 \cos. \frac{2k\pi}{n} x + 1 = 0$, it is obvious that

if $2 \cos. \frac{2k\pi}{n}$ is known, two of the roots of the equation

$x^n - 1$ become also known, and conversely if the roots of the equation $x^n - 1$ can be found independently of the for-

mula $x^2 - 2 \cos. \frac{2k\pi}{n} x + 1 = 0$, the co-efficient $2 \cos. \frac{2k\pi}{n}$

will be determined, being equal to two of the roots from the known theory of equations; and hence it is obvious in what manner the division of the circle, or the general inscription of polygons in a circle, depends upon the solution of the equation $x^n - 1 = 0$. Our object, therefore, will be to explain the general solution of this binomial equation. 1 . All the imaginary roots of the equation $x^n - 1 = 0$, n being a prime number, are different powers of the same imaginary quantities, and, therefore, different powers of each other; that is, if r be one root of the equation $x^n - 1 = 0$, then will all the imaginary roots of this equation be contained in the series

$$r, r^2, r^3, r^4, \text{ and } r^{n-1}$$

This is evident; for since $r^n = 1$, $(r^2)^n = 1$, $(r^3)^n = 1$, &c. or $r^2, r^3, r^4, \&c.$ are each equal to 1 , which is the condition of the equation; and it may readily be shewn that these roots are all different from each other.

Hence,

Hence, again, it follows, r^n being one of the roots, or $r^n = 1$, that $r^{n+1} = r$, $r^{n+2} = r^2$, $r^{n+3} = r^3$ &c.; and therefore the series

$$r, r^2, r^3, r^4, r^5 \text{ \&c. } r^{n-1}$$

being continued beyond r^{n-1} , and r^n , will recur again in the same order, and become

$$r^{n+1}, r^{n+2}, r^{n+3}, r^{n+4} \text{ \&c.}$$

Or, if we assume, for the first root, r^a , a being any number prime to n , then we should have for our series of roots

$$r^a, r^{2a}, r^{3a}, r^{4a}, \text{ \&c. } r^{(n-1)a},$$

which being continued, will give the same series over again in precisely the same order.

Now this series, containing in it all the imaginary roots of the equation $x^n - 1 = 0$, and the sum of all the roots of every equation being equal to the co-efficient of the second term, it follows, that the sum of all these imaginary roots must be equal to *minus* the real root, which is 1, that is,

$$r^a + r^{2a} + r^{3a} + r^{4a} + \text{ \&c. } r^{(n-1)a} = -1,$$

and their continued product

$$r^a \times r^{2a} \times r^{3a} \times r^{4a} \text{ \&c. } r^{n-1)a} = +1,$$

the absolute term, these being both well-known properties of every equation.

Having said thus much, by way of introduction, which was necessary for comprehending the method pursued by M. Gauss, we will now attempt a slight sketch of his solution of the equations under discussion; but in a work of this kind, the reader will not expect to find a complete development of it, as this would far exceed the limits that can be allowed for this article.

We have shewn above, that the whole series of imaginary roots of the equation $x^n - 1 = 0$, by being continued beyond the term $r^{(n-1)a}$, will recur again in the same order as at first, also n being always supposed a prime number $n - 1$, the number of imaginary roots is an even number, and consequently a composite number; and this composite number of roots may therefore be separated into equal periods of roots, which periods may, in all cases, be so selected, as to possess the same property as the whole series, *viz.* they may be so selected, that each period being continued, the roots in each will recur again in the same order as at first, and it is on this separation of the original periods of roots into other inferior periods that the particular solution of M. Gauss depends; for when this is done, the products or the sums of any number of these periods will be equal to the sums of similar series: but the demonstration of this property is too long to be admitted into this article, and we can therefore only refer the reader to the work itself, or to those which have since been written on the same subject as enumerated at the conclusion of this article.

In order to illustrate what has been said in the preceding columns, and to shew its application to the solution of the proposed equation, we shall select two or three of the simplest cases, which will at once put the reader in possession of the method of solution, which is all that can be attempted in this place.

Let it then be proposed to find the four imaginary roots of the equation $x^5 - 1 = 0$; which answers to the division of the circle into five equal parts, or the inscription of a pentagon in a circle.

Let r represent one of the imaginary roots of this equation, then from what is said above the four roots will be r, r^2, r^3, r^4 .

Now let these roots be divided into the periods

$$\begin{aligned} r + r^4 &= p \\ r^2 + r^3 &= p' \end{aligned}$$

By the addition of the two, we have

$$r + r^2 + r^3 + r^4 = p + p' = -1;$$

and the product of them gives

$$r^3 + r^4 + r + r^2 = pp';$$

or, since $r^5 = r^{4+1} = r$, and $r^7 = r^{5+2} = r^2$, we have

$$r^3 + r + r^4 + r^2 = pp' = -1.$$

Hence we have $p + p' = -1$,
and $pp' = -1$,

the solution of which gives

$$p = \frac{-1 + \sqrt{5}}{2}, \text{ and } p' = \frac{-1 - \sqrt{5}}{2};$$

and now, having obtained the values of p and p' , we may readily find those of r, r^4 , and r, r^3 ; but this is not necessary to our inquiry, for we have seen that the general factor of the equation $x^n - 1 = 0$, is

$$x^2 - 2 \operatorname{cof.} \frac{2k\pi}{r} + 1 = 0,$$

and consequently, that $2 \operatorname{cof.} \frac{2k\pi}{r}$ is equal to the sum of

two of the roots of the proposed equation, which sum we have already found; *viz.* making $k = 1$, and $\pi = 180^\circ$, we have

$$r + r^4 = p = \frac{-1 + \sqrt{5}}{2} = 2 \operatorname{cof.} \frac{360^\circ}{5}$$

$$r^2 + r^3 = p' = \frac{-1 - \sqrt{5}}{2} = 2 \operatorname{cof.} \frac{720^\circ}{5}.$$

The roots themselves, however, if required, are contained in the two quadratics

$$x^2 - \left(\frac{-1 + \sqrt{5}}{2} \right) x + 1 = 0$$

$$x^2 - \left(\frac{-1 - \sqrt{5}}{2} \right) x + 1 = 0,$$

which, with the real root 1, complete the solution of the equation.

In this equation the four roots were decomposed into two periods, of two terms each, and it was therefore only necessary to find the sum of the two periods, and their product, which required only the solution of a quadratic equation; but when this cannot be done, that is, when $n - 1$ is such as not to consist of some power of 2, then the roots must be divided into periods, according to the factors of $n - 1$, and whatever number of periods there may be, the solution of the equation will require that the sum of them, the sum of the product of every two, of every three, &c. be known; and, consequently, the equation by which they are expressed, will rise to a dimension equal to the number of such periods.

Thus, in the equation $x^7 - 1 = 0$, since $7 - 1 = 6 = 2.3$, the series of roots will be divided into three periods, of two roots each, and the solution of the equation will depend upon the resulting cubic equation.

Here the imaginary roots being $r, r^2, r^3, r^4, r^5, r^6$, and the periods

$$\begin{aligned} r + r^6 &= p \\ r^2 + r^4 &= p' \\ r^3 + r^5 &= p'' \end{aligned}$$

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we must find the value of $p + p' + p''$, of $pp' + pp'' + p'p''$, and of $p p' p''$, then the cubic equation having these quantities for its co-efficients, will have for its roots the three quantities p, p', p'' .

Now, by really taking these sums and products, we find

$$p + p' + p'' = r + r^2 + r^3 + r^4 + r^5 + r^6 = -1,$$

$$\begin{aligned} p p' &= r^1 + r^2 + r^5 + r^3 \\ p' p'' &= r^3 + r^6 + r + r^2 \\ p p'' &= r^1 + r + r^6 + r^4, \end{aligned}$$

and therefore

$$p p' + p p'' + p' p'' = 2(r + r^1 + r^1 + r^1 + r^5 + r^6) = -2,$$

and in the same way we find

$$p p' p'' = -(r + r^2 + r^3 + r^4 + r^5 + r^6) = 1;$$

therefore the cubic equation containing these three values of $p p' p''$, is

$$p^3 + p^2 - 2p - 1 = 0,$$

the solution of which gives

$$\begin{aligned} p &= 1.2469796 = 2 \operatorname{cof.} \frac{360^\circ}{7} \\ p' &= -1.8019376 = 2 \operatorname{cof.} \frac{2 \times 360^\circ}{7} \\ p'' &= -0.4450420 = 2 \operatorname{cof.} \frac{3 \times 360^\circ}{7} \end{aligned}$$

which is all that is required for the division of the circle into seven parts; but the roots themselves, if required, are contained in the three following quadratics,

$$\begin{aligned} x^2 - p x + 1 &= 0 \\ x^2 - p' x + 1 &= 0 \\ x^2 - p'' x + 1 &= 0. \end{aligned}$$

Let us now attempt the solution of $x^7 - 1 = 0$, which it will appear may be effected by means of quadratic equations only, and consequently a polygon of this number of sides may be inscribed geometrically in a circle, a problem which, before the publication of the work above-mentioned, was thought to be totally beyond the reach either of geometry or analysis.

Here the 16 imaginary roots being first decomposed into the two following periods, *viz.*

$$\begin{aligned} p &= r + r^2 + r^3 + r^5 + r^6 + r^7 + r^4 + r^2 \\ p' &= r^3 + r^{10} + r^5 + r^1 + r^{13} + r^7 + r^{12} + r^5, \end{aligned}$$

we have, by the actual addition and multiplication of the two periods,

$$\begin{aligned} p + p' &= -1 \\ p p' &= -4; \end{aligned}$$

whence, $p = -\frac{1}{2} + \frac{1}{2} \sqrt{17}$, and $p' = -\frac{1}{2} - \frac{1}{2} \sqrt{17}$.

Now, let these periods p, p' , be decomposed into two others, denoted as below by q and q' , *viz.*

$$\begin{aligned} \text{period } p &\begin{cases} q = r + r^{13} + r^6 + r^1 \\ q' = r^2 + r^{15} + r^3 + r^2 \end{cases} \\ \text{period } p' &\begin{cases} q'' = r^3 + r^5 + r^{14} + r^{12} \\ q''' = r^{10} + r^{11} + r^7 + r^5, \end{cases} \end{aligned}$$

which, being added and multiplied as above, give

$$\begin{aligned} q + q' &= p = -\frac{1}{2} + \frac{1}{2} \sqrt{17} \\ q q' &= p + p' = -1; \end{aligned}$$

whence,

$$\begin{aligned} q &= \frac{1}{2} p + \frac{1}{2} \sqrt{4 + p'} \\ q' &= \frac{1}{2} p - \frac{1}{2} \sqrt{4 + p'}, \end{aligned}$$

and in the same way,

$$\begin{aligned} q'' &= \frac{1}{2} p' + \frac{1}{2} \sqrt{4 + p''} \\ q''' &= \frac{1}{2} p' - \frac{1}{2} \sqrt{4 + p''}. \end{aligned}$$

Again, subdividing these four periods, each into two others, (of which, however, one only, as the first, will be sufficient for our purpose,) we shall have the sums of each pair of roots of the equation proposed. Now,

$$\text{period } q \begin{cases} t = r + r^{16} \\ t' = r^{13} + r^1, \end{cases}$$

which, by addition and multiplication, give

$$\begin{aligned} t + t' &= q = \frac{1}{2} p + \frac{1}{2} \sqrt{4 + p^2} \\ t t' &= q'' = \frac{1}{2} p' + \frac{1}{2} \sqrt{4 + p'^2}; \end{aligned}$$

therefore the quadratic equation, containing the roots t, t' , is

$$t^2 - q t + q'' = 0,$$

whence,

$$\begin{aligned} t &= \frac{1}{2} q + \frac{1}{2} \sqrt{q^2 - 4 q''} \\ t' &= \frac{1}{2} q - \frac{1}{2} \sqrt{q^2 - 4 q''}, \end{aligned}$$

the first of which is the greatest positive root, corresponding

to the 2 cof. $\frac{360^\circ}{17}$; which, by substituting for q and q'' ,

their respective values become =

$$\frac{1}{2} \left\{ \frac{1}{2} p + \frac{1}{2} \sqrt{4 + p^2} + \frac{1}{2} \sqrt{\left\{ \frac{1}{2} p + \frac{1}{2} \sqrt{4 + p^2} \right\}^2 - 4 \frac{1}{2} p' + \frac{1}{2} \sqrt{4 + p'^2}} \right\}$$

and in this expression, by re-establishing the values of p and p' ,

we have, in numbers, $2 \operatorname{cof.} \frac{360^\circ}{17} =$

$$\begin{aligned} &\frac{1}{2} \left(\frac{1}{2} \left(-\frac{1}{2} + \frac{1}{2} \sqrt{17} \right) + \frac{1}{2} \sqrt{\frac{1}{2} (17 - \sqrt{17})} \right) + \\ &\frac{1}{2} \sqrt{\left(\frac{1}{2} \left(-\frac{1}{2} + \frac{1}{2} \sqrt{17} \right) + \frac{1}{2} \sqrt{\frac{1}{2} (17 - \sqrt{17})} \right)^2 - 4 \left(\frac{1}{2} \left(-\frac{1}{2} - \frac{1}{2} \sqrt{17} \right) + \frac{1}{2} \sqrt{\frac{1}{2} (17 + \sqrt{17})} \right)}, \end{aligned}$$

which is the true numeral value of $2 \operatorname{cof.} \frac{360^\circ}{17}$.

These examples are sufficient for throwing some light on the method of solution adopted by M. Gauss in his work entitled "Disquisitiones Arithmeticae," but those who are desirous of entering more fully into the spirit of that method, must consult the work itself, or its translation, under the title of "Récherches Arithmétiques." An explanation and illustration of the same theorem is also given by Legendre, in the second edition of his "Essai sur la Théorie des Nombres," and the same again in its most simple form in Barlow's "Theory of Numbers." From what has been said in the preceding part of this article, it appears that the equations by which the circle may be divided into a prime number of equal parts n , depend upon the factors of $n - 1$; that is, upon the subdivision of its $n - 1$ roots into periods; thus, if $n - 1 = a^\alpha, b^\beta, c^\gamma, \&c.$ then the solution will be effected by α equations of the degree a , β of the degree b , γ of the degree c , and so on; whence, if $n = 11$, because $n - 1 = 10 = 2^1 \cdot 5^1$, the solution depends upon one equation of the fifth degree and one of the second. For in this case we can only decompose the ten imaginary roots into five periods of two terms each, or into two periods of five terms each; and in the first instance it is obvious that, in order to get the sum of all the p 's, as $p + p' + p'' + p'''$, &c. the sum of the product of every two, of every three, &c. the equation must necessarily rise to the 5th degree. And if, according to the other division, the roots are resolved into two periods of five terms each, though the value of these periods would be found by a quadratic, yet this would be of no use, as we should thus have only the value of the sum of five of the roots, whereas it appears from what has been said in the preceding part of this article, that it is only by knowing the sum of two roots that the solution of the equation can

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be determined. It is therefore necessary in all cases to manage the division so that the final equation may be a quadratic, that is, so that the number of terms in each period in the last instance shall not exceed two, which may always be done, because $n - 1$ is always an even number; and thus, when $n - 1$ is any complete power of 2, as we can then every step divide each period into two others, it follows that the solution of such an equation may always be effected by means of quadratic equations only; and consequently a polygon of such a number of sides may be inscribed geometrically in a circle. Now, 5, 17, 257, 65537, are prime numbers of this form, and therefore each of these admit of a geometrical construction; which, with the polygons that yield to the common operations of geometry, as enumerated in the beginning of this article, form the following series of polygons, each of which possesses the same property.

Polygons of less than 100 sides admitting of a geometrical construction.

No. of Sides.	No. of Sides.	No. of Sides.
3 = trigon.	16 = 2^4	48 = 3.16
4 = 2^2	17 = $2^4 + 1$	51 = 3.17
5 = $2^2 + 1$	20 = 4.5	60 = 2.30
6 = 2.3	24 = 3.8	64 = 2^6
8 = 2^3	30 = 3.10	68 = 2.34
10 = 2.5	32 = 2^5	80 = 2.40
12 = 3.4	34 = 2.17	85 = 5.17
15 = 3.5	40 = 2.20	96 = 2.48

And to the above may be added the three consecutive polygons

$$255, 256, 257,$$

each of which is inscribable in a circle; for

$$255 = 3 \cdot 5 \cdot 17, \quad 256 = 2^8, \quad \text{and} \quad 257 = 2^8 + 1, \text{ a prime.}$$

The three next consecutive polygons that admit of a geometrical construction, are the following, viz.

$$\begin{aligned} 65535 &= 255 \times 257 \\ 65536 &= 2^{16} \\ 65537 &= 2^{16} + 1, \text{ a prime.} \end{aligned}$$

POLYGON, in *Fortification*, denotes the figure or perimeter of a fortress, or fortified place. See FORTIFICATION.

POLYGON, *Exterior*, is a right line drawn from a vertex or point of a bastion, to the vertex or point of the next adjacent bastion. Such is the line CF, *Plate I. Fortification, fig. 1.*

POLYGON, *Interior*, is a right line drawn from the centre of one bastion to the centre of another. Such is the line GH.

POLYGONS, *Line of*, is a line on the French sectors, containing the homologous sides of the first nine regular polygons inscribed in the same circle, i. e. from an equilateral triangle to a dodecagon. See SECTOR.

POLYGONAL COLUMN. See COLUMN.

POLYGONAL Numbers, are those that are formed of the sums of different and independent arithmetical series, and are termed natural, triangular, quadrangular, pentagonal, hexagonal, &c. numbers; according to the series from which they are generated.

Lineal or natural numbers are formed from the successive sums of a series of units; thus,

$$\begin{array}{lcl} \text{Units} & - & 1, 1, 1, 1, 1, 1, \&c. \\ \text{Natural numbers} & & 1, 2, 3, 4, 5, 6, \&c. \end{array}$$

Triangular numbers are the successive sums of an arithmetical series, beginning with unity, the common difference of which is 1; thus,

$$\begin{array}{lcl} \text{Arithmetical series} & & 1, 2, 3, 4, 5, 6, 7, \&c. \\ \text{Triangular numbers} & & 1, 3, 6, 10, 15, 21, 28, \&c. \end{array}$$

Quadrangular or square numbers are the successive sums of an arithmetical progression, beginning with unity, the common difference of which is 2; thus,

$$\begin{array}{lcl} \text{Arithmetical series} & & 1, 3, 5, 7, 9, 11, 13, \&c. \\ \text{Quadrangles or squares} & & 1, 4, 9, 16, 25, 36, 49, \&c. \end{array}$$

Pentagonal numbers are the sums of an arithmetical series, the common difference of which is 3; thus,

$$\begin{array}{lcl} \text{Arithmetical series} & & 1, 4, 7, 10, 13, 16, 19, \&c. \\ \text{Pentagonals} & & 1, 5, 12, 22, 35, 51, 70, \&c. \end{array}$$

And universally, the *m-gonal series of numbers* is formed from the successive sums of an arithmetical progression, beginning with unity, the common difference of which is $m - 2$.

The general form, which includes every order of polygonal numbers, is

$$\frac{(m - 2)n^2 - (m - 4)n}{2}$$

where m is the denomination of the order; therefore, making successively $m = 3, 4, 5, \&c.$ we have the following results as to the forms of polygonals.

$$m = 3 \text{ Triangular numbers} = \frac{n^2 + n}{2}$$

$$m = 4 \text{ Squares} = \frac{2n^2 - 0n}{2} = n^2$$

$$m = 5 \text{ Pentagonals} = \frac{3n^2 - n}{2}$$

$$m = 6 \text{ Hexagonals} = \frac{4n^2 - 2n}{2}$$

By means of the above general form, any polygonal number, of which the root n is given, may be readily ascertained. Thus by making $m = 3, m = 4, m = 5, \&c.$ and in each series $n = 1, 2, 3, 4, 5, \&c.$ we shall obtain the same numbers as given above, under each respective denomination. Also any polygonal number, and its denomination being given, the root of the polygon is readily obtained. For let

$$P = \frac{(m - 2)n^2 - (m - 4)n}{2}$$

represent any given polygonal, of which the denomination m is known: then

$$(m - 2)n^2 - (m - 4)n = 2P$$

$$\text{or} \quad n^2 - \left(\frac{m - 4}{m - 2}\right)n = \frac{2P}{m - 2}$$

$$\text{whence} \quad n = \frac{m - 4 \pm \sqrt{(2P(m - 2) + (m - 4)^2)}}{2m - 4}$$

which is a general form for the root of every polygonal number.

Fermat, at page 15, in one of his notes to prop. 9 of Diophantus on Multangular Numbers, has given particular rules for finding the roots of given polygonal numbers, without the extraction of the square root; but they are

of little or no use, and therefore we shall not enumerate them.

We may also find the sum of any series of polygonals by means of the foregoing general formula, for representing still the denomination of any order of polygonals by m , and for abridging make $m - 2 = d$, the common difference of the series from which they are generated; and let n be the number of terms in the series whose sum is required, then we shall have

$$\left(\frac{n^2 - 1}{6}d + \frac{n + 1}{2}\right)n = \left(\frac{n^2 - 1}{6}(m - 2) + \frac{n + 1}{2}\right)n$$

for the sum of the n terms sought.

Hence, substituting successively the numbers 3, 4, 5, &c. for m , there are obtained the following particular cases, or formulæ, viz.

Triangulars	-	$\frac{n^2 + 3n + 2}{6}n$,
Squares	-	$\frac{2n^2 + 3n + 1}{6}n$,
Pentagonals	-	$\frac{3n^2 + 3n + 0}{6}$
Hexagonals	-	$\frac{4n^2 + 3n - 1}{6}n$,
&c.		&c.

The denomination of polygonals seems to have been given to this class of numbers, from the circumstance that they may be represented by the particular figures, the names of which they bear, and the *side of the figure* is the same as what we call the *root of the polygon*. Thus

Triangles	.	.	.	.	&c.
	
Squares	.	.	.	.	&c.
	

See some particular rules for arranging the points in a note subjoined to the English edition of Euler's Algebra.

POLYGONATUM, in *Botany*, supposed to be the *πολυγονάσιον* of Dioscorides, so called from *πολυ*, many, and *γονον*, a knice, or joint, because the root consists of many joints. This appellation has been bestowed on several species of the Linnæan genus *Convallaria*, which are otherwise called Solomon's Seal, in allusion to the scars, like the impressions of a seal, left where the stems of former seasons have stood. Linnæus retains *Polygonatum* for the specific name of the species with an angular stalk, Engl. Bot. t. 280; but Matthioli seems to understand *C. multiflora* as the *πολυγονάσιον* of Dioscorides. Both are found in Greece, and both were probably confounded by the ancient, as they seem to be by the modern, inhabitants of that country, under the name in question. We have always suspected that Linnæus, in his application of it, adverted to the many angles of the stem, understanding the word as derived from *γωνια*, an angle.

POLYGOŒÆ, Juss. 82. Brown Prodr. Nov. Holl. v. 1. 413, a natural order of plants, the 28th in Jussieu's system, or the fifth of his sixth class; for the characters of which class. see LAUREL. The order is thus defined.

Calyx of one leaf, divided. *Stamens* definite in number, inserted into the lower part of the calyx. *Germen* simple, superior; styles either several, or none at all; stigmas

several. *Seed* solitary, naked; or invested with the calyx, which then assumes the appearance of being superior. *Cork* immersed in a farinaceous albumen. *Leaves* alternate, sheathing at the base, or combined with an intrafoliateous membranous sheath (or *stipula*); revolute when young. *Stem* for the most part herbaceous.

The genera are *Coccoloba*, *Atraphaxis*, *Polygonum*, *Rumex*, *Rheum*, *Triplaris*, *Calligonum*, (from which *Pallasia* of Linn. Suppl. is now acknowledged, on all hands, not to differ,) and *Koenigia*. To these, which are all Linnæan, is to be added **ERIOGONUM**; see that article. Mr. Brown remarks, that in this last-named genus there is no sheath to the footstalk, and the albumen moreover is fleshy, as well as in very small quantity; but the erect seed with its superior radicle is esteemed by him as deciding the place of *Eriogonum*, those marks serving chiefly to distinguish the order of *Polygoneæ*, from such of the *Atriplices* of Jussieu, as constitute the *Cheupodeæ* of Decandolle.

POLYGONELLA, a diminutive of *Polygonum*, applied by Michaux, Fl. Boreal-Amer. v. 2. 240, to a supposed genus, which Ventenat very properly reduces to *Polygonum*, in his Jardin de Cels, t. 65, and which Mr. Pursh suspects to be not even specifically distinct from *P. articulatum* of Linnæus. See **POLYGONUM**.

POLYGONIFOLIA of Dillenius. See **CORRIGIOLA**.

POLYGONOIDES. See **CALLIGONUM**.

POLYGONOMETRY is an extension of the science of trigonometry, having the same reference to polygons in general, as trigonometry has to triangles in particular. We owe this extension of the rules of trigonometry to L'Huillier, who published a treatise on this subject at Geneva in 1789, which, with the exception of a short chapter in vol. iii. of Dr. Hutton's Course of Mathematics, is, we believe, the only work on polygonometry at present before the public; the reader, therefore, will not be displeased to find here a statement of some of the principal propositions of this new science; at the same time it will not be expected that we should enter at great length on the subject, but merely trace the analogy between the rules of trigonometry and those of polygonometry, and exhibit the demonstrations of two or three of the most remarkable cases.

In the common cases of trigonometry, a triangle is determined by means of two sides and an angle; or, which is the same, by its sides except one, and its angles except two. In like manner, in polygonometry a polygon may be determined when all its sides except one, and its angles except two, are given. A triangle also is determined by one side and two angles; that is, by its sides except two, and its angles except one. So likewise here any rectilinear figure is determinable when its sides except two, and its angles except one, are given. Again, a triangle is determinable when its three sides are given, that is, when all its sides are known, and its angles except three. So likewise in polygonometry, when all the sides of a polygon are given, and all its angles, except three, those three angles may be determined.

Note.—It is frequently necessary, in exhibiting the rules or formulæ of this science, to express the angles formed by two sides of the polygon, when those sides are not in contact in the diagram, by which is always to be understood the angle that they would form if produced till they meet; and this is indicated by a caret being put between two letters or pairs of letters denoting lines; thus, C B ^ F A denotes the inclination of the line C B to F A, or the angle that would be formed by the prolongment of those lines till they meet.

POLYGONOMETRY.

Theorem I.—In any polygon, any one side is equal to the sum of all the rectangles of each of the other sides, drawn into the cosine of the angle made by that side, and the side required to be found *Plate XI. Geometry, fig. 7.*

Let $A B C D E F$ be a polygon; then will

$$A F = \left\{ \begin{array}{l} A B \cdot \text{cof. } A + B C \cdot \text{cof. } C B^{\wedge} F A + C D \cdot \text{cof. } C D^{\wedge} A F \\ + D E \cdot \text{cof. } D E^{\wedge} A F + E F \cdot \text{cof. } E F^{\wedge} F A \end{array} \right.$$

For drawing lines from the several angles respectively parallel and perpendicular to $A F$, it will be

$$\begin{aligned} A b &= A B \cdot \text{cof. } B A F \\ b c &= B \beta = B C \cdot \text{cof. } C B \beta = B C \cdot \text{cof. } C B^{\wedge} A F \\ c d &= \delta D = C D \cdot \text{cof. } C D \delta = C D \cdot \text{cof. } C D^{\wedge} A F \\ d e &= \epsilon E = D E \cdot \text{cof. } D E \epsilon = D E \cdot \text{cof. } D E^{\wedge} A F \\ e F &= E F \cdot \text{cof. } E F e = E F \cdot \text{cof. } E F^{\wedge} A F \end{aligned}$$

$$\text{But } A F = b c + c d + d e + e F - A b$$

And $A b$, as expressed above, is in effect subtractive, because the cosine of the obtuse angle $B A F$ is negative, Consequently,

$$A F = \left\{ \begin{array}{l} A c + c d + d e + e F = \\ A B \cdot \text{cof. } B A F + B C \cdot \text{cof. } C B^{\wedge} A F + \&c. \end{array} \right.$$

which was to be demonstrated. And a like demonstration will apply to any other polygon. When the sides are reduced to three, this theorem becomes the same as the fundamental theorem for triangles.

Theorem II.—The perpendicular let fall from the highest point or summit of a polygon upon the opposite side or base, is equal to the sum of the products of the sides comprised between that summit and the base, into the sines of their respective inclinations to that base.

Thus, referring still to the same figure,

$$\begin{aligned} C c &= C B \cdot \text{fin. } C B^{\wedge} F A + B A \cdot \text{fin. } A, \text{ or} \\ C c &= \left\{ \begin{array}{l} C D \cdot \text{fin. } C D^{\wedge} A F + D E \cdot \text{fin. } D E^{\wedge} A F \\ + E F \cdot \text{fin. } F \end{array} \right. \end{aligned}$$

as is evident from an inspection of the figure.

In like manner,

$$\begin{aligned} D d &= D E \cdot \text{fin. } D E^{\wedge} A F + E F \cdot \text{fin. } F, \text{ or} \\ D d &= \left\{ \begin{array}{l} C B \cdot \text{fin. } C B^{\wedge} F A + B A \cdot \text{fin. } A \\ - C D \cdot \text{fin. } C D^{\wedge} A F \end{array} \right. \end{aligned}$$

Hence the sum of the products of each side, into the sine of the sum of the *exterior* angles (or into the sine of the sum of supplements of the interior angles) comprised between those sides and a determined side, is equal to zero; that is, in the preceding figure

$$\begin{aligned} &A B \cdot \text{fin. } A + B C \cdot \text{fin. } (A + B) + C D \cdot \text{fin. } (A + B + C) + \\ &D E \cdot \text{fin. } (A + B + C + D) + E F \cdot \text{fin. } (A + B + C + D + E) = 0 \end{aligned}$$

Hence, also, by substituting in this expression, for $\text{fin. } (A + B)$ $\text{fin. } (A + B + C)$, &c. their proper values; *viz.*

$$\begin{aligned} \text{fin. } (A + B) &= \text{fin. } A \cdot \text{cof. } B + \text{fin. } B \cdot \text{fin. } \text{cof. } A \\ \text{fin. } (A + B + C) &= \text{fin. } A \cdot \text{cof. } (B + C) + \text{fin. } (B + C) \cdot \text{cof. } A \\ \&c. & \qquad \qquad \&c. \qquad \qquad \&c. \end{aligned}$$

And recollecting also that $\tan. a = \frac{\text{fin. } a}{\text{cof. } a}$, we shall have

$$\tan. B A F = \frac{B C \cdot \text{fin. } B + C D \cdot \text{fin. } (B + C) + D E \cdot \text{fin. } (B + C + D) + \&c.}{A B + B C \cdot \text{cof. } B + C D \cdot \text{cof. } (B + C) + D E \cdot \text{cof. } (B + C + D) + \&c.}$$

which is frequently an useful formula when the number of sides exceed four.

When the number of sides is three, or when the figure becomes a triangle, we have

$$\begin{aligned} \tan. C A B &= \frac{B C \cdot \text{fin. } B}{A B + B C \cdot \text{cof. } B} \\ \tan. B C A &= \frac{A B \cdot \text{fin. } B}{B C + A B \cdot \text{cof. } B} \end{aligned}$$

Theorem III.—The square of any side of a polygon is equal to the square of the sum of all the other sides; *minus* twice the sum of the products of all the other sides multiplied two and two, by the cosines of the angles they include. *Fig. 8.*

$$a^2 = b^2 + c^2 + d^2 - 2 (b c \cdot \text{cof. } b^{\wedge} c + b d \cdot \text{cof. } b^{\wedge} d + c d \cdot \text{cof. } c^{\wedge} d)$$

And in like manner:

$$c^2 = a^2 + b^2 + d^2 - 2 (a b \cdot \text{cof. } a^{\wedge} b + a d \cdot \text{cof. } a^{\wedge} d + b d \cdot \text{cof. } b^{\wedge} d)$$

For the sake of brevity, let the sides be represented by the small letters which stand against them in the figure; then from *Theorem I.* we shall have the following equations, *viz.*

$$\begin{aligned} a &= b \cdot \text{cof. } a^{\wedge} b + c \cdot \text{cof. } a^{\wedge} c + d \cdot \text{cof. } a^{\wedge} d \\ b &= a \cdot \text{cof. } a^{\wedge} b + c \cdot \text{cof. } b^{\wedge} c + d \cdot \text{cof. } b^{\wedge} d \\ c &= a \cdot \text{cof. } a^{\wedge} c + b \cdot \text{cof. } b^{\wedge} c + d \cdot \text{cof. } c^{\wedge} d \\ d &= a \cdot \text{cof. } a^{\wedge} d + b \cdot \text{cof. } b^{\wedge} d + c \cdot \text{cof. } c^{\wedge} d \end{aligned}$$

Multiplying the first of these equations by a , and the second by b , the third by c , and the fourth by d , subtracting the three latter products from the first, and transposing b^2 , c^2 , d^2 , there will result

Or,

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Or, since $b^{\wedge}c = C$, $b^{\wedge}d = C + D - 180$, $c^{\wedge}d = D$, we have

$$\begin{aligned} a^2 &= b^2 + c^2 + d^2 - 2 (bc \cdot \text{cof. } C - b^{\wedge}d \cdot \text{cof. } (C + D) + c^{\wedge}d \cdot \text{cof. } D) \\ c^2 &= a^2 + b^2 + d^2 - 2 (ab \cdot \text{cof. } B - b^{\wedge}d \cdot \text{cof. } (A + B) + a^{\wedge}d \cdot \text{cof. } A) \\ &\quad \text{\&c.} \quad \quad \quad \text{\&c.} \quad \quad \quad \text{\&c.} \end{aligned}$$

The same process applied to the pentagon $A B C D E$, will give

$$a^2 = b^2 + c^2 + d^2 + e^2 - 2 \left\{ \begin{array}{l} bc \cdot \text{cof. } C - bd \cdot \text{cof. } (C + D) \\ + be \cdot \text{cof. } (C + D + E) + cd \cdot \text{cof. } D \\ - ce \cdot \text{cof. } (D + E) + de \cdot \text{cof. } E \end{array} \right.$$

And a similar demonstration is obvious, applicable to a polygon of any number of sides; whence the truth of the proposition is manifest.

Theorem IV.—Twice the surface of any polygon is equal to the sum of the rectangles of its sides, except one taken two and two, by the sines of the sum of the exterior angles contained by those sides. *Fig. 9.*

For a trapezium, or polygon of four sides. Let the two sides, AB , DC , be produced till they meet at P ; then the trapezium $ABCD$ is manifestly equal to the difference between the triangles PAD and PBC . But twice the surface of the triangle PAD is $= AP \cdot PD \cdot \text{fin. } P = (AB + BP) \cdot (DC + CP) \cdot \text{fin. } P$; and twice the sur-

face of the triangle $PBC = BP \cdot PC \cdot \text{fin. } P$: therefore their difference, or twice the area of the trapezium $= (AB \cdot CD + AB \cdot CP + CD \cdot BP) \cdot \text{fin. } P$. Now in the triangle PBC ,

$$\text{fin. } P : \text{fin. } B :: BC : PC = \frac{BC \cdot \text{fin. } B}{\text{fin. } P}$$

$$\text{fin. } P : \text{fin. } C :: BC : PB = \frac{BC \cdot \text{fin. } C}{\text{fin. } P}$$

Substituting these values of PB , PC , for them in the above equation, and observing that $\text{fin. } P = \text{fin. } (PEC + PCB) = \text{fin. of the sum of exterior angles } B \text{ and } C$, there results,

$$\text{Twice the surface of } ABCD = \left\{ \begin{array}{l} AB \cdot BC \cdot \text{fin. } B \\ + AB \cdot DC \cdot \text{fin. } (B + C) \\ + BC \cdot DC \cdot \text{fin. } C \end{array} \right.$$

Since $AB \cdot BC \cdot \text{fin. } B =$ twice the area of the triangle ABC , it follows that twice the triangle ACD is equal to the remaining two terms, *viz.*

$$\text{Twice area } ACD = \left\{ \begin{array}{l} AB \cdot DC \cdot \text{fin. } (B + C) \\ + BC \cdot DC \cdot \text{fin. } C \end{array} \right.$$

For a pentagon, as $ABCDE$, see *fig. 10.* Its area is obviously equal to the sum of the areas of the trapezium $ABCD$, and of the triangle ADE .

Let the sides AB and DC , as before, meet when produced at P ; then from the above we have,

$$\text{Twice area } ABCD = \left\{ \begin{array}{l} AB \cdot BC \cdot \text{fin. } B \\ + AB \cdot DC \cdot \text{fin. } (B + C) \\ + BC \cdot DC \cdot \text{fin. } C \end{array} \right.$$

Also,

$$\text{Twice triangle } DAE = \left\{ \begin{array}{l} AP \cdot DE \cdot \text{fin. } (P + D), \text{ or fin. } (B + C + D) \\ + DP \cdot DE \cdot \text{fin. } D \end{array} \right.$$

Therefore,

$$\text{Twice area } ABCDE = \left\{ \begin{array}{l} AB \cdot BC \cdot \text{fin. } B \\ + AB \cdot DC \cdot \text{fin. } (B + C) \\ + AB \cdot DE \cdot \text{fin. } (B + C + D) \\ + BC \cdot DC \cdot \text{fin. } C \\ + BC \cdot DE \cdot \text{fin. } (C + D) \\ + DC \cdot DE \cdot \text{fin. } D \end{array} \right.$$

Taking away from this expression the first, second, and fourth terms, which together make double the trapezium $ABCD$, there will remain,

$$\text{Twice the area of } DAE = \left\{ \begin{array}{l} AB \cdot DE \cdot \text{fin. } (B + C + D) \\ + BC \cdot DE \cdot \text{fin. } (C + D) \\ + DC \cdot DE \cdot \text{fin. } D \end{array} \right.$$

For the hexagon $ABCDEF$, see *fig. 11.*

The double area will be found by supposing it divided into the pentagon $ABCDE$, and the triangle AEF . For by the preceding part of the proposition we have,

$$\begin{aligned} \text{Twice area of } ABCDE &= \left\{ \begin{array}{l} AB \cdot BC \cdot \text{fin. } B \\ + AB \cdot CD \cdot \text{fin. } (B + C) \\ + AB \cdot DE \cdot \text{fin. } (B + C + D) \\ + BC \cdot CD \cdot \text{fin. } C \\ + BC \cdot DE \cdot \text{fin. } (C + D) \\ + CD \cdot DE \cdot \text{fin. } D \end{array} \right. \\ \text{Twice area of } AEF &= \left\{ \begin{array}{l} AP \cdot EF \cdot \text{fin. } (B + C + D + E) \\ + DP \cdot EF \cdot \text{fin. } (D + E) \\ + DE \cdot EF \cdot \text{fin. } E \end{array} \right. \end{aligned}$$

Or

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$$\text{Or twice area of AEF} = \begin{cases} AB \cdot EF \cdot \text{fin. } (B + C + D + E) \\ + DC \cdot EF \cdot \text{fin. } (D + E) \\ + DE \cdot EF \cdot \text{fin. } E \\ + BP \cdot EF \cdot \text{fin. } (B + C + D + E) \\ + CP \cdot EF \cdot \text{fin. } (D + E) \end{cases}$$

Now writing for BP, CP, their respective values, $\frac{BC \cdot \text{fin. } C}{\text{fin. } (B + C)}$, and $\frac{BC \cdot \text{fin. } B}{\text{fin. } (B + C)}$, the sum of the last two expressions in the double areas of AEF will become

$$BC \cdot EF \cdot \frac{\text{fin. } C \cdot \text{fin. } (B + C + D + E) + \text{fin. } B \cdot \text{fin. } (D + E)}{\text{fin. } (B + C)}$$

And this, by means of the analytical expression for five arcs, becomes

$$BC \cdot EF \cdot \text{fin. } (C + D + E).$$

Whence collecting and properly arranging the term as before, we shall obtain,

$$\text{Twice the area ABCDEF} = \begin{cases} AB \cdot BC \cdot \text{fin. } B \\ + AB \cdot CD \cdot \text{fin. } (B + C) \\ + AB \cdot DE \cdot \text{fin. } (B + C + D) \\ + AB \cdot EF \cdot \text{fin. } (B + C + D + E) \\ + BC \cdot CD \cdot \text{fin. } C \\ + BC \cdot DE \cdot \text{fin. } (C + D) \\ + BC \cdot EF \cdot \text{fin. } (C + D + E) \\ + CD \cdot DE \cdot \text{fin. } D \\ + CD \cdot EF \cdot \text{fin. } (D + E) \\ + DE \cdot EF \cdot \text{fin. } E \end{cases}$$

In a similar manner may the area of a heptagon be determined, by finding the sum of the area of the hexagon, and the adjacent triangle; and hence the area of the octagon, nonagon, or any other polygon, may be inferred; the law of continuation being sufficiently obvious from what is done

above, and the number of terms = $\frac{n-1}{1} \times \frac{n-2}{2}$, the number of sides of the polygon being n : for the number of terms is evidently the same as the number of ways in which $n-1$ quantities can be taken two and two, that is, by the nature of permutation = $\frac{n-1}{1} \times \frac{n-2}{2}$.

The above curious theorem was first investigated by Simon L'Huilier, and published by him in 1789. Its principal advantage over the common method for finding the area of irregular polygons is, that here there is no occasion to construct the figures, and of course the errors that may arise from such constructions are avoided.

In the application of this theorem to practical purposes, the above expressions become more simple by dividing the proposed polygon into two parts by a diagonal, and computing the area of each part separately.

Thus by dividing the trapezium ABCD (*fig. 8.*) into two triangles by the diagonal AC, we shall have,

$$\text{Twice area ABCD} = \begin{cases} AB \cdot BC \cdot \text{fin. } B \\ + CD \cdot AD \cdot \text{fin. } D \end{cases}$$

The pentagon ABCDE (*fig. 9.*) may be divided into a trapezium and triangle; whence,

$$\text{Twice area of ABCDE} = \begin{cases} AB \cdot BC \cdot \text{fin. } B \\ + AB \cdot DC \cdot \text{fin. } (B + C) \\ + BC \cdot DC \cdot \text{fin. } C \\ + DE \cdot AE \cdot \text{fin. } E \end{cases}$$

And in the same manner, by dividing the hexagon into two trapeziums, by a diagonal drawn from A to D, which is to be the line excepted in the theorem, we shall have,

$$\text{Twice area of ABCDEF} = \begin{cases} AB \cdot BC \cdot \text{fin. } B \\ + AB \cdot DC \cdot \text{fin. } (B + C) \\ + BC \cdot DC \cdot \text{fin. } C \\ + DE \cdot EF \cdot \text{fin. } E \\ + DE \cdot AF \cdot \text{fin. } (E + F) \\ + EF \cdot AF \cdot \text{fin. } F \end{cases}$$

For more on this subject, see L'Huilier's Treatise on Polygonometry, and chap. 6. vol. iii. of Dr. Hutton's Course of Mathematics.

POLYGONUM, in Botany, a name adopted from Dioscorides, whose πολυγωνον ἀρρην, or male polygonum, seems, without doubt, our *P. aviculare*, or Common Knot-grass. The numerous knots or joints of the stem and branches, readily explain the word; see also POLYGONATUM. Linn. Gen. 195. Schreb. 264. Willd. Sp. Pl. v. 2. 440. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 423. Prodr. Fl.

Græc. Sibth. v. 1. 264. Brown Prodr. Nov. Holl. v. 1. 419. Pursh 269. Ait. Hort. Kew. v. 2. 416. Juss. 82. Tourn. t. 290. Lamarck Illustr. t. 315. Gært. t. 119. (Bistorta; Tourn. t. 291. Perficaria; Tourn. t. 290. Gært. t. 119. Fagopyrum; Tourn. t. 290. Gært. t. 119. Helxine; Linn. Gen. ed. 1—5.)—Class and order, *Oxandria Trigynia*. Nat. Ord. *Holeraceæ*, Linn. *Polygonææ*. Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, turbinate, internally coloured, in five deep, ovate, obtuse, permanent segments.

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segments. *Cor.* none, unless the calyx be taken for such. *Stam.* Filaments generally eight, awl-shaped, very short; anthers roundish, incumbent. *Pist.* Germen superior, triangular; styles mostly three, thread-shaped, very short; stigmas simple. *Peric.* none, the calyx folding over the seed. *Seed* one, acute, with three, rarely only two, angles.

Obf. The stamens are in some species but seven, six, or five; the styles in some are only two, and these are often combined in their lower part. *P. frutescens* has three large segments to the calyx, with two smaller ones. Reichard is pleased to call the former *petals*; see his *Gen. Pl.* 200. Linnæus himself in *Syst. Veg.* terms the whole calyx a corolla, certainly contrary to all analogy, especially of the natural order where he properly places this genus; he is of course copied by Willdenow.

Eff. Ch. Calyx in five deep segments, coloured, petal-like, permanent. Seed one, superior, angular, covered by the calyx. Stamens and styles uncertain in number.

Thirty-one species of *Polygonum* are defined in the 14th edition of *Syst. Veg.* Willdenow has forty-three. Mr. Brown has twelve or thirteen new ones in his *Prodromus* of New Holland plants; and several additional American species are recorded by Michaux and Pursh. Twenty-three are mentioned in *Hort. Kew.* We shall, according to our usual custom, particularize the British species, which amount to ten, introducing along with them some of the most remarkable exotics.

The whole are disposed in five sections, chiefly named in allusion to the genera into which authors, antecedent to Linnæus, had divided his *Polygonum*.

SECT. 1. Atraphaxoides. Stem shrubby. Two species.

P. frutescens. Shrubby Polygonum. Linn. Sp. Pl. 516. Willd. n. 1. Ait. n. 1. (*P. fruticosum*, &c. n. 46; Gmel. Sib. v. 3. 60. t. 12. f. 2.)—Stem shrubby. Two outer segments of the calyx smallest, reflexed.—Native of Siberia; introduced into Kew garden by M. Richard, in 1770, flowering in July and August. The stem is shrubby, with smooth, whitish, leafy branches. Leaves alternate, about an inch long, lanceolate, somewhat spatulate, acute, entire, naked, smoothish, tapering at the base. Stipula membranous, torn, investing the branch within the insertion of each leaf, and reaching about half way to the next. Flowers numerous, in terminal clusters, with sheathing membranous bracteas; each flower on a capillary single-jointed stalk. Calyx small when in flower, white or reddish, with a broad green keel to the two smaller external segments: as the seed advances, these become reflexed, and somewhat enlarged; but the three inner, more petal-like divisions, are by degrees greatly dilated, and reticulated with strong veins; embracing the seed, as in *Rumex*. Some contend that Gmelin's n. 45. t. 12. f. 1, is but a spinescent variety.

SECT. 2. Bistortæ. Spike solitary. Two species.

P. Bistorta. Great Bistort; or Snakeweed. Linn. Sp. Pl. 516. Willd. n. 3. Ait. n. 2. Fl. Brit. n. 6. Curt. Lond. fasc. 1. t. 22. Engl. Bot. t. 509. Woodv. Med. Bot. t. 34. (Bistorta; Matth. Valgr. v. 2. 296. Camer. Epit. 683. B. major; Ger. Em. 399.)—Stem quite simple. Spike solitary. Leaves ovate, waved, running down into the footstalks.—Frequent in rather hilly pastures, in Germany, Switzerland, France, and the northern parts of England, flowering in June. The thick, woody, twisted root is perennial, and of an astringent quality. Stems about a foot and half high, each with one erect, cylindrical, thickish, obtuse spike, or dense cluster, of not inelegant rose-coloured flowers, destitute of scent. Stamens eight.

Styles three. The leaves are three or four inches long and above one broad, veiny, entire, glaucous beneath; the radical ones on long stalks, and most numerous.

P. viviparum. Alpine Bistort. Linn. Sp. Pl. 516. Willd. n. 4. Ait. n. 3. Fl. Brit. n. 7. Engl. Bot. t. 669. Fl. Dan. t. 13. (Bistorta minor; Camer. Epit. 684. Ger. Em. 399.)—Stem quite simple. Spike solitary. Leaves lanceolate, revolute.—Native of alpine pastures, in Lapland, Germany, Switzerland, and Britain. It grows in dry stony places, and is not uncommon about the sides and summits of the Scottish mountains, as well as in Westmoreland and the north of Yorkshire, flowering in June and July. This species is allied to the last, but seldom one third its size, with narrower, scarcely decurrent, leaves, whose revolute edges are, as it were, stiched with veins, and partly ferrated. The spike is more slender and elongated, its lower flowers viviparous, or rather their place is supplied by leafy buds. The seeds of the rest are rarely perfected. The number of stamens and styles is like that of the preceding.

SECT. 3. Perficariæ. Styles two, distinct or combined. Stamens generally fewer than eight. Fifteen species in Willdenow; nine new ones in Brown.

P. lapathifolium. Pale-flowered Perficaria. Linn. Sp. Pl. 517. Willd. n. 6. Ait. n. 5. Fl. Brit. n. 3. Engl. Bot. t. 1382. (*P. pensylvanicum*; Curt. Lond. t. 24, 25. Hydropiper; Ger. Em. 445.)—Stamens six. Styles two. Flower-stalks rough. Stipulas beardless. Seeds concave on each side.—Found on dunghills, and about rich moist places, in France and England, flowering in July and August. Not unfrequent in the neighbourhood of Paris and London. This is an annual, bushy, leafy herb, with swollen, jointed stems. Leaves alternate, stalked, lanceolate, entire; sometimes marked with a blackish spot, and occasionally hoary beneath. Stipulas lax, ribbed, almost always destitute of marginal bristles. Flower-stalks clothed with a glandular roughness, characteristic of the species. Flowers in dense copious spikes, mostly of a pale greenish-white; but sometimes red, as well as the stems. Mr. Curtis, whose observations on the various species of *Polygonum* have, more than those of any other botanist, served to place them in a clear light, erred like Hudson in taking this for the Linnæan *pensylvanicum*; which has likewise rough flower-stalks, but its stamens are eight, spikes lax, and leaves long and taper-pointed.

P. amphibium. Amphibious Perficaria. Linn. Sp. Pl. 517. Willd. n. 7. Ait. n. 6. Fl. Brit. n. 1. Curt. Lond. fasc. 4. t. 28. Engl. Bot. t. 436. Fl. Dan. t. 282. (Potamogeton angustifolium; Ger. Em. 821.)—Stamens five. Styles two, combined. Spike ovate.—Frequent in Europe, floating on the surface of still waters, which are ornamented with its beautiful crimson upright spikes in July and August. The roots are perennial and creeping. Stems throwing out copious radicles, by which they often creep over the mud about the borders of ponds, as well as float on the water. Stipulas entire. Leaves stalked, lanceolate, acute, finely ferrated, smooth, bright green, mostly floating.

P. Hydropiper. Biting Perficaria. Linn. Sp. Pl. 517. Willd. n. 9. Ait. n. 8. Fl. Brit. n. 4. Curt. Lond. fasc. 1. t. 26. Engl. Bot. t. 989. (Hydropiper; Fuchf. Hist. 842. t. 843.)—Stamens six. Styles two, combined at the bottom. Leaves lanceolate, waved. Spikes slender, drooping. Stem erect.—Common in ditches, and watery places, throughout Europe, flowering in August and September. This species is annual, and readily known by its pale unspotted leaves, and lax, slender, drooping spikes, of red

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red and white inconspicuous *flowers*. The *stamens*, usually six, very rarely vary to eight. *Styles* combined about half their length. Herb with a very hot acrid taste, owing to an essential oil, dispersed in glandular dots over the surface, and for the most part conspicuous on the *calyx*. Hence the name of *Hydropiper*, Water-pepper.

P. minus. Small Creeping Perficaria. Hudf. ed. 1. 148. Willd. n. 12. Ait. n. 10. Fl. Brit. n. 5. Curt. Lond. fasc. 1. t. 28. Engl. Bot. t. 1043. (Perficaria pusilla repens; Ger. Em. 446.)—Stamens six. Styles two, combined nearly to the top. Leaves linear lanceolate, flat. Spikes slender, almost erect. Stem creeping at the base.—Native of gravelly inundated spots, in various parts of Europe, flowering in autumn. Smaller and more creeping than the last, though likewise annual. Much ambiguity has formerly existed concerning this species, which Linnæus thought a variety of his *P. Perficaria*, and some others have referred to *Hydropiper*; but the want of glandular dots, and especially the close union of the *styles*, are sufficient to distinguish it, which marks were pointed out by Mr. Curtis. Sometimes there are three *stigmas*.

P. Perficaria. Spotted Perficaria. Linn. Sp. Pl. 518. Willd. n. 13. Ait. n. 11. Fl. Brit. n. 2. Curt. Lond. fasc. 1. t. 23. Engl. Bot. t. 756. Fl. Dan. t. 702. (Perficaria maculosa; Ger. Em. 445.)—Stamens six. Styles two, combined below. Spikes ovate-oblong, erect. Flower-stalks smooth. Stipulas fringed.—Extremely common in ditches, marshes, waste ground, and inundated fields, flowering principally in July and August. It is annual, but larger and more erect than the last, the *stem* scarcely creeping at the base. Each *leaf* is usually marked with a central, black, horse-shoe, or kidney-shaped, spot; the under side dotted with glands, and sometimes white and downy. The latter variety is Willdenow's *P. incanum*, n. 14, separated by him and some others, we presume improperly, from *Perficaria*. Its figure may be seen in Petiver's Herb. Brit. t. 3. f. 8; and another more slender, and more silvery, variety, at f. 9. The *spikes* of the species before us are short and rather thick, on smooth stalks. *Flowers* rose-coloured, with two, rarely three, *styles*, combined half way up.

P. orientale. Great Garden Perficaria. Linn. Sp. Pl. 519. Willd. n. 18. Ait. n. 12. Curt. Mag. t. 213. (Perficaria orientalis, nicotianæ folio, calyce florum purpureo; Tourn. Cor. 38.)—Stamens seven. Styles two, distinct. Leaves ovate, dependent. Stipulas hairy, salver-shaped. Stem erect, paniced. Spikes pendulous.—Native of the East. Tournefort obtained its seeds from the gardens of some convents in his journey, and it has ever since been a favourite and hardy annual in the European collections, and indeed in almost every cottage garden in England and France, sowing itself spontaneously, and blooming throughout the autumn. The *stem* is round, five or six feet high. *Leaves* large, downy, and flaccid. *Flower-stalks* paniced, hairy, laden with thick, obtuse, cylindrical, drooping *spikes*, of beautiful crimson, but inodorous, *flowers*. There is a white variety.

SECT. 4. Polygonæ. *Leaves undivided. Stamens eight.* Eleven species in Willdenow; two new ones in Brown.

P. maritimum. Sea Knot-grass. Linn. Sp. Pl. 519. Willd. n. 20. Sm. Prodr. Fl. Græc. Sibth. v. 1. 266. Fl. Græc. t. 363, unpublished. (*P. maritimum*; Camer. Epit. 691. Bauh. Hist. v. 3. 377, copied in Petiver's Herb. Brit. t. 10. f. 5.)—*Flowers* axillary. Styles three. Leaves elliptical. Ribs of the stipulas numerous, crowded. Stem shrubby, procumbent.—Native of the sandy sea-shores of the Mediterranean and Archipelago. *Stem* procumbent, a

foot long, much branched and somewhat woody, perennial. *Leaves* elliptical, stalked, glaucous, about an inch long. *Stipulas* long and membranous, with numerous close nerves. *Flowers* axillary, two or three together, flesh-coloured, or simple stalks. The whole plant is larger than the following, and essentially distinguished by the crowded ribs of its *stipulas*; to say nothing of its perennial woody habit, and broad glaucous *leaves*, whose edges are smooth, or very nearly so.

P. aviculare. Common Knot-grass. Linn. Sp. Pl. 519. Willd. n. 21. Ait. n. 13. Fl. Brit. n. 8. Engl. Bot. t. 1252. Curt. Lond. fasc. 1. t. 27. Mart. Ruft. t. 91. (*P. mas vulgare*; Ger. Em. 565.)—*Flowers* axillary. Styles three. Leaves elliptic-lanceolate, rough-edged. Ribs of the stipulas remote. Stem procumbent, herbaceous.—A common weed in every part of Europe, growing amongst rubbish, in towns, path-ways, &c. It is smaller than the last, though very variable in size, and of only annual duration. The crimson *flowers* are beautiful under a magnifier, and very copiously produced. One of Ray's very few errors consisted in mistaking a large maritime variety of this species, found on the coast of Cornwall, for the true *P. maritimum* above described.

P. equisetiforme. Horse-tail Knot-grass. Sibth. in Prodr. Fl. Græc. v. 1. 266. Fl. Græc. unpubl. t. 364.—*Flowers* axillary. Styles two, distinct.—Leaves oblong, revolute. Stipulas many-ribbed, in numerous capillary segments. Stem shrubby, ascending.—Found by Dr. Sibthorp, in hedges in Crete. Its shrubby *stem* agrees with *P. maritimum*, but its greater height and more erect mode of growth, as well as the narrower revolute *leaves*, distinguish it. The *styles* being only two afford a clear mark of difference, between *P. equisetiforme*, and both *maritimum* and *aviculare*. The *flowers* are variegated with green and white. *P. setosum*, Jacq. Obs. fasc. 3. 8. t. 57. Willd. n. 23, bears a considerable resemblance to our plant, but its *styles* are said to be three, and the *leaves* linear awl-shaped, which description by no means accords with *P. equisetiforme*.

P. divaricatum. Spreading White Knot-grass. Linn. Sp. Pl. 520. Willd. n. 26. Ait. n. 16. (*P. n. 42*; Gmel. Sib. v. 3. 57. t. 11. f. 1. Fagopyrum orientale, ramosum et multiflorum, perficariæ folio; Tourn. Cor. 39. Buxb. Cent. 2. 31. t. 31.) *Stem* much branched, smooth, spreading. Clusters lax. Leaves lanceolate, smooth. Stamens eight. Styles three.—Native of Siberia, as well as of Armenia, in the corn-fields of which last country Buxbaum says it is a troublesome weed. Miller seems to have introduced this plant into Chelsea garden, where it still abounds, making a very handsome appearance in June and July, with copious clusters of large white *flowers*. We have not seen it elsewhere, though it certainly merits general notice. The *root* is creeping, perennial, hardy, yellow. *Stems* three or four feet high, round, reedy, leafy, with abundance of wide-spreading smooth *branches*. *Leaves* clustered, lanceolate, acute, smooth, two or three inches long, on stalks of various lengths. *Clusters* lax, spreading. *Flowers* large, uniformly white.

Section 5. Helxine of Linnæus formerly. *Leaves dilated, and somewhat heart-shaped.* Thirteen species.

P. Fagopyrum. Common Buck-wheat. Linn. Sp. Pl. 522. Willd. n. 39. Ait. n. 21. Fl. Brit. n. 9. Mart. Ruft. t. 46. Engl. Bot. t. 1044. (Tragopyron; Ger. Em. 89.)—Leaves heart-arrow-shaped. Stem nearly upright, without prickles. Angles of the seeds even.—Native of the East, though now naturalized in England, Germany, &c., flowering in July and August. It is often cultivated for the sake of the seeds, an excellent food for pheasants, as

well as for domestic fowls. The *root* is annual, fibrous. *Herb* rather succulent, a foot or two high; with a zig-zag, round, branched, leafy *stem*, smooth, except a downy line along one side. *Leaves* acute, entire, smooth; the uppermost sessile. *Flowers* handsome, copious, red and white, in panicled *clusters*. Five of the eight *stamens* seem more perfect than the rest, and bear anthers whose lobes are separated by a short bar. *Styles* three, quite distinct. Edges of the *seed* even and straight, not lobed nor undulated as in some of the foreign species of this section.

P. Convolvulus. Climbing Buck-wheat. Black Bind-weed. Linn. Sp. Pl. 522. Willd. n. 40. Ait. n. 22. Fl. Brit. n. 10. Curt. Lond. fasc. 4. t. 29. Fl. Dan. t. 744. Engl. Bot. t. 941. (*Volubilis nigra*; Ger. Em. 863.)—Leaves heart-arrow-shaped. Stem twining, angular. Segments of the calyx bluntly keeled.—A frequent and troublesome weed in cornfields throughout Europe, flowering in June and July. The *root* is annual. The *stem* twines about corn and other plants, to the height of three feet or more, and is angular, roughish, somewhat branched. *Leaves* pale green, smooth, acute, entire, all stalked. *Clusters* axillary and terminal, interrupted with small leaves. *Flowers* drooping, variegated with green and white, often purplish. *Stamens* six or eight, uniform. *Styles* three, combined below; rarely only two. *Seeds* smaller than the last; their angles even, and sides concave. Small birds are fond of these seeds.

P. dumetorum. Bush Buck-wheat. Linn. Sp. Pl. 522. Willd. n. 41. Prodr. Fl. Græc. n. 411. Fl. Dan. t. 756.—Leaves heart-shaped, pointed. Stem twining, angular, smooth. Segments of the calyx winged at the keel.—Native of shady bushy places, chiefly in the south of Europe; unknown in England, even in our gardens. It is annual, larger than the preceding, with elongated leafy *clusters*. The *flowers* are readily distinguished by the dilated keels of the three large segments of the *calyx*, enclosing the triangular even-edged seed.

POLYGONUM, in *Gardening*, contains a plant of the herbaceous annual kind, of which the species cultivated is the oriental perficaria (*P. orientale*).

Of this there is a dwarf variety, and another with white flowers.

Method of Culture.—This plant is constantly raised from seeds, and is said to rise from scattered seeds better than when sown; but where they are sown, it should be in autumn, soon after they are ripe, as, when sown in the spring, they rarely succeed; or, if some plants come up, they seldom grow so strong. They may be removed in the spring into the borders of the plantation or flower-garden, giving them room. They are, however, commonly sown in the spring, with other annuals; thinning the seedlings, when they appear, so as to stand a foot apart. About the beginning of July, the side-shoots should be pruned off, to make them advance in height, and preserve them within compass; and when they are pruned up to five or six feet, they may be permitted to shoot out side branches. It delights in a rich moist soil. The seeds are sometimes sown on hot-beds, in March, in order to be more forward.

These plants are distinguished for their superior stature, and the brilliancy of their flowers: they frequently grow to the height of eight or ten feet, and rival the sun-flower.

POLYGRAM, in *Geometry*, a figure consisting of many lines.

POLYGRAPHY, POLYGRAPHIA, or *Polygraphice*, formed from *πολυ*, *multum*, and *γραφειν*, *scriptura*, *writing*, the art of writing in various unusual manners or cyphers; as also the art of decyphering the same.

The word is usually confounded with steganography, and cryptography.

The ancients seem to have been very little acquainted with this art; nor is there any mark of their having gone beyond the Lacedæmonian Scytala.

Trithemius, Porta, Vigenera, and father Niceron, have written on the subject of polygraphy, or *cyphers*; which see.

POLYGYNIA, in *Botany*, from *πολυς*, *many*, and *γυνή*, *a female*, the appellation of an order in several classes of the Linnæan system. The name expresses its character, which consists in a multitude of pistils. This order occurs in the 5th and 6th classes, as well as in the 12th and 13th; to the two latter of which it most naturally belongs, as the flowers of these classes have likewise numerous stamens.

POLYHEDRON, or POLYEDRON, *Πολυεδρον*, formed from *πολυ*, *much*, and *εδρα*, *seat*, in *Geometry*, a body comprehended under many rectilinear sides or planes.

If the sides of the polyhedron be regular polygons, all similar and equal, the polyhedron becomes a regular body, and may be inscribed in a sphere; that is, a sphere may be drawn round it, so that its surface shall touch all the solid angles of the body.

POLYHEDRON, *Gnomonic*, is a stone with several faces, on which are projected various kinds of dials. See DIAL.

Of this kind, that in the privy-garden, London, now gone to ruin, was anciently the finest in the world.

POLYHEDRON, or *Polyscope*, in *Optics*, is a glass, or lens, consisting of several plain surfaces, disposed into a convex form; popularly called a *multiplying-glass*.

The phenomena of the polyhedron are as follow: 1. If several rays, as E F, A B, C D, (*Plate XVII. Optics, fig. 12.*) fall parallel on the surface of a polyhedron, they will continue parallel after refraction.

If then the polyhedron be supposed regular, L H, H I, I M, will be as tangents, cutting the spherical convex lens in F, B, and D; consequently, rays falling on the points of contact, intersect the axis. Wherefore, since the rest are parallel to these, they will also mutually intersect each other in G.

Hence, if the eye be placed where parallel rays decussate, rays of the same object will be propagated to it still parallel from the several sides of the glass. Wherefore, since the crystalline humour, by its convexity, unites parallel rays, the rays will be united in as many different parts of the retina, *a, b, c*, as the glass has sides.

Consequently the eye, through a polyhedron, sees the object repeated as many times as there are sides. And hence, since rays coming from remote objects are parallel, a remote object is seen as often repeated through a polyhedron, as that has sides.

2. If rays A B, A C, A D (*fig. 13.*), proceeding from a radiant point A, fall on several sides of a regular polyhedron; after refraction they will decussate in G, and proceed on a little diverging.

Hence, if the eye be placed where the rays coming from the several planes decussate, the rays will be propagated to it from the several planes a little diverging: *i. e.* as if they proceeded from different points. But since the crystalline humour, by its convexity, collects rays from several points in the same point; the rays will be united in as many different points in the retina, *a b c*, as the glass has sides; consequently, the eye, being placed in the focus G, will see even a near object repeated as often through the polyhedron as that has sides.

Thus may the images of objects be multiplied in a camera obscura, by placing a polyhedron at its aperture, and

adding a convex lens at a due distance from it. And it makes a very pleasant appearance, if a prism be applied so that the coloured rays of the sun refracted from it be received on the polyhedron: for by this means they will be thrown on a paper or wall, near at hand, in lucid specks, much exceeding the brightness of any precious stone; and in the focus of the polyhedron where the rays decussate (for in this experiment they are received on the convex side) will be a star of surprising lustre.

If images be painted in water-colours in the areolæ, or little squares of a polyhedron, and the glass applied to the aperture of a camera obscura; the sun's rays, passing through it, will carry with them the images of it, and project them on the opposite wall.

This artifice bears a resemblance to that other, by which an image on paper is projected on the camera; viz. by wetting the paper with oil, and straining it tight in a frame; then applying it to the aperture of the camera obscura, so that the rays of a candle may pass through it upon the polyhedron.

To make an *Anamorphosis*, or *deformed Image*, which, through a Polyhedron, or Multiplying-glass, shall appear regular and beautiful.—At one end of a horizontal table erect another at right angles, on which a figure may be designed; and on the other erect another, to serve as a fulcrum, or support, moveable on the horizontal one. To the fulcrum apply a plano-convex polyhedron, consisting, e. gr. of twenty-four plain triangles; let the polyhedron be fitted in a draw-tube, of which that end towards the eye is to have only a very small aperture, and a little farther off than the focus. Remove the fulcrum from the other perpendicular table, till it be out of the distance of the focus; and that more, as the image is to be greater. Before the little aperture place a lamp; and trace the luminous areolæ projected from the sides of the polyhedron, with a black-lead pencil, on the vertical plane, or a paper applied on it.

In the several areolæ, design the several parts of an image, in such a manner as that, when joined together, they may make one whole, looking afresh every now and then through the tube to guide, correct, &c. the colours, and to see that the several parts match aptly together.

The intermediate space fill up with any figures or designs at pleasure, contriving it so, as that to the naked eye the whole may exhibit some appearance very different from that intended to appear through the polyhedron.

The eye, now looking through the little aperture of the tube, will see the several parts and members dispersed among the areolæ to exhibit one continued image, all the intermediate ones disappearing. See ANAMORPHOSIS.

POLYHEDROUS FIGURE, in *Geometry*, a solid, contained under, or consisting of many sides. See POLYHEDRON.

POLYHISTOR is used for a person of great and various erudition. See POLYMATHY.

POLYHYMNIA, in *Mythology*, one of the nine Muses, distinguished among authors and poets by holding some stringed instrument of music in her hands, and by marking out what she sings with her hand. See MUSES.

POLYMATHY, POLYMATHIA, Πολυμαθία, from πολυ, *multum*, and μαθησις, *disco, I learn*, the knowledge of many arts and sciences; or an acquaintance with a great number of different subjects.

Lipsius, Scaliger, Kircher, Petavius, Grotius, Salmasius, Leibnitz, &c. were famous for polymathy. Among the ancients, such as were eminent this way were called *polybistores*.

Polymathy is frequently little more than a confused

heap of useless erudition, occasionally detailed, either pertinently or impertinently, for parade. The genuine polymathy is an extensive erudition, or a knowledge of a great number of things, well digested, and applied to the purpose, and never but where they are necessary.

POLYMERIA, in *Botany*, from πολυ, *much*, and μερρις, *assistance*, a name well chosen by Mr. Brown, to express the superabundance of stigmas with which this genus is furnished, in comparison with *Convolvulus*, though its seeds are fewer.—Brown Prodr. Nov. Holl. v. 1. 488.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Campanaceæ*, Linn. *Convolvuli*, Juss.

Ess. Ch. Calyx in five deep segments. Corolla funnel-shaped, plaited. Stigmas from four to six, acute. Germs of two single-seeded cells. Capsule of one cell, with one or two seeds.

The genus consists of herbaceous, diffuse, or creeping plants, which have no milky juice. Their flower-stalks are axillary, each bearing a pair of bractæas. Five New Holland species are defined by the author above mentioned, and possibly others may be latent among the undescribed stores of collectors.

1. *P. calycina*. "Segments of the calyx unequal; the outer ones heart-shaped at their base. Seeds smooth."—Found by Mr. Brown in New Holland. There are two varieties: one with oblong, obtuse, and nearly smooth leaves; growing near Port Jackson, as well as within the tropic: the other with oblong-linear finely downy leaves, confined to the latter climate.

2. *P. pusilla*. "Segments of the calyx equal. Leaves heart-shaped, somewhat emarginate. Flowers solitary. Seeds rather villous."—Native of the tropical part of New Holland, as are all the following species. There are two varieties of *P. pusilla*; one in which the leaves are ovate and obtuse: while in the other they are somewhat hastate and linear.

3. *P. quadrivalvis*. "Segments of the calyx equal. Leaves heart-shaped, obtuse; smooth above; veins slightly downy beneath. Stalks single-flowered. Capsule with four valves, and two downy seeds."

4. *P. lanata*. "Segments of the calyx equal. Leaves heart-shaped, obtuse with a small point; woolly, like the seeds, on both sides. Stalks single-flowered."

5. *P. ambigua*. "Segments of the calyx equal. Leaves oblong-heart-shaped, obtuse with a small point; nearly smooth above; woolly beneath. Stalks with from one to three flowers."—By the name, as well as the characters, the distinction between this and the last appears doubtful.

POLYMNASTIC AIR, a name for flutes in the ancient Greek music, invented, according to some, by a woman of the name of Polymnestra, and according to others, by the son of Miles of Corinth.

POLYMNIA, in *Botany*, a genus which appears, by the 5th edition of Linnæus's *Genera Plantarum*, 396, to have been founded and named by Kalm; but of its etymology no account is there given: nor does this name occur in the *Philosophia Botanica*, published three years earlier. As the plant is of the tribe of sunflowers, possibly the author had in his mind πολυμνια, one of the Muses. The same word is, as professor Martyn remarks, an epithet of the sea, from πολυς and μινος, *abounding with moss or sea-weed*; but this idea does not apply to the subject before us.—Linn. Gen. 444. Schreb. 581. Willd. Sp. Pl. v. 3. 2335. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 5. 164. Pursh v. 2. 579. Juss. 187. Lamarek Illustr. t. 711. Gartn. t. 174. (*Tetragonotheca*; Linn. Gen. 438.)—Class and order,

order, *Syngenesia Polygamia-necessaria*. Nat. Ord. *Compositæ oppositifoliae*, Linn. *Corymbiferae*, Juss.

Gen. Ch. *Common Calyx* double; the *outer* largest, spreading, of four or five ovate leaves; *inner* of ten boat-shaped upright leaves. *Cor.* compound, radiant. *Florets* of the disk perfect, numerous, funnel-shaped, five-cleft; those of the radius five or ten, ligulate, with two or three teeth. *Stam.* in the florets of the disk. Filaments five; anthers united into a hollow cylinder, rather longer than the corolla. *Pist.* in the same florets, Germen minute; style thread-shaped, as long as the stamens; stigma obtuse: in those of the radius, Germen ovate, rather large; style thread-shaped, the length of the tube; stigmas two, acute. *Peric.* none, the calyx remaining unaltered. *Seeds* in the disk none; in the florets of the radius solitary, obovate, gibbous, somewhat angular at the inner side, naked. *Recept.* chaffy, convex, imbricated; the scales ovate, obtuse, concave, the length of the florets.

Eff. Ch. Receptacle chaffy. Seed-down none. Calyx double; the outer of four or five leaves; inner of ten concave leaves.

1. *P. canadensis*. Canadian Polymnia. Linn. Sp. Pl. 1303. Willd. n. 1. Ait. n. 1. (Polymnia; Linn. Am. Acad. v. 3. 15. t. 1. f. 5.)—Leaves toothed, pointed; the lower ones pinnatifid; the upper either three-lobed or undivided.—Found on shady mountains, from Canada to Virginia, flowering in June and July. *Pursh.* The root is perennial. *Herb* two to six feet high, downy and viscid, with a strong balsamic scent. *Branches* and *leaves* usually alternate; the latter not unlike those of a Sow-thistle. *Flowers* at the ends of the upper branches, few, or solitary, yellow, not ornamental.

2. *P. Uvedalia*. Broad-leaved Polymnia. Linn. Sp. Pl. 1303. Willd. n. 2. Ait. n. 2. (*P. maculata*; Cavan. Ic. v. 3. 14. t. 227.)—Leaves three-lobed, acute, deeply sinuated, running down into the footstalks.—Native of the mountains of Virginia and Carolina, as well as of Mexico, flowering from July to September. It has long been in our gardens, and occasionally occurs in the more curious collections. The *stem* is above the height of a man. *Leaves* opposite, not unlike those of a plane tree. *Flowers* yellow, two inches wide, with a large leafy external *calyx*.

3. *P. abyssinica*. Narrow-leaved Polymnia. Linn. Suppl. 383. Willd. n. 3. Ait. n. 3.—Leaves opposite, sessile, linear-lanceolate, somewhat toothed.—Brought from Abyssinia, as it is said, by James Bruce, esq. in 1775. It has flowered in the stove at Kew, in April and May; but being biennial, we know not that it is still preserved, nor does it appear to be any where figured. The *stem* is from two to six feet high, spotted, roughish, leafy, sparingly branched in the upper part. *Leaves* two or three inches long, and half an inch broad, acute, toothed in some parts, entire in others, clasping the stem with their dilated base. *Flowers* terminal, stalked. Outer *calyx* of five large heart-shaped leaves. *Corolla* yellow; the radiant florets large, dilated outwards. *Seeds* are said to be perfected in all the florets.

For other species, referred by Linnæus to this genus, see DIDELTA.

POLYMORPHOS, variously shaped, an epithet often given to the os sphenoides.

POLYMYTHY, ΠΟΛΥΜΥΘΙΑ, in *Poetry*, denotes a multiplicity of fables, in an epic or dramatic poem; in lieu of an unity or a single one.

Polymythia is a great fault. It consists in joining a number of distinct actions or fables into one complex body. Such a work Bossu compares to the Batrachomyomachia,

or one of the fables of Æsop: and such would be the idea of a Theſeid, an Heracleid, an Achilleid, or the like poems, which should comprehend all the actions of those heroes compared with the Iliad or Æneid. See FABLE.

POLYNEMUS, in *Ichthyology*, a genus of fishes of the order Abdominales, of which the generic character is; head compressed, covered with scales; snout very obtuse and prominent; gill-membrane from five to seven-rayed; pectoral fins with distinct appendages. The fishes of this genus are chiefly distinguished from those of the Trigla family, in having ventral fins placed on the abdomen, and in the appendages not being articulate. Four species are enumerated by Gmelin, which are as follow.

Species.

QUINQUARIUS. Appendages five, which are longer than the body. It is found in the American seas, as is the next.

VIRGINICUS. Seven appendages, with a tail entire. In this the gill-covers are serrate; the first ray of the first dorsal fin is very short; the tail is broad and very sharp.

PARADISEUS. Seven appendages; tail forked. This is also called the fish of Paradise, or mango fish. It grows to the length of about twelve or fifteen inches, and the thoracic filaments are very long, the outer ones often extending beyond the tail, and the others gradually shortening. It inhabits the Indian seas, and is reckoned the most delicate fish they have at Calcutta.

PLEBEIUS. Five appendages, the first extending beyond the tail, the others gradually shortening. This fish, which is called the Plebeian polyneme, resembles a mullet, except that its head is much blunted. It sometimes measures four feet in length. It is a native of the American and Indian seas, and is considered as excellent food.

POLYNESIA, derived from a Greek term signifying *many islands*, in *Geography*, an appellation by which De Brosses, more than half a century ago, distinguished the numerous isles in the Pacific ocean. (See AUSTRALASIA.) The division called Polynesia is by far the most extensive, and adjoins on the W. to a line drawn around the Asiatic isles; thence it ascends about lat. 18°. E. long. 128° in a N.E. direction, so as to include the isle called Rica de Plata, long. 161°, and thence curving S.E. and encompassing the northern Sandwich islands, where our great navigator fell, and the Marquesas, and extending to 120° W. from London. Any isles to the N.E. or E. of this line of demarcation may be regarded as belonging to North or South America. The southern boundary of the Asiatic isles may be considered as sufficiently ascertained by the wide channel between them and New Holland; while the N.W. extremity of Sumatra may present a meridian of separation on the W. between the Asiatic isles, eminently so styled, and those in the Indian ocean. The same western boundary may be assigned to Australasia. The southern limits of the last, and of Polynesia, alone remain; but as few or no islands have been discovered to the S. of New Zealand, the parallel of 50° S. lat. may be laxly assumed as the boundary of both. Polynesia will thus extend from 50° S. lat. to about 35° N. lat.; that is, 85°, or 5100 geographical miles; while the breadth taken from E. long. 170° to 130° W. upon the equator itself, will yield 60°, or 3600 geographical miles. For the dimensions of *Australasia*, see that article. The smallest division, that of the Asiatic isles, in what has been called the Oriental Archipelago, is of great extent from S. lat. 30° to N. lat. 22°, that is, 35° or 2100 geographical miles; while the length from E. long. 95° to 132°

yields 37 degrees not far from the equator, nearly corresponding with the breadth.

The chief subdivisions of Polynesia are as follow; viz. the Pelew isles, the Ladrones, the Carolines, the Sandwich isles, the Marquesas, the Society isles, and the Friendly isles; besides many other scattered in different directions, of small consequence, and not easily connected with any group. Pinkerton's Geog. vol. ii.

POLYNOMIAL, or *Multinomial Roots*, in *Mathematics*. See MULTINOMIAL, and ROOT.

To raise a polynomial to any given power, may be done by Sir Isaac Newton's binomial theorem. Among other methods of demonstrating this, we have one by signor Castillioni in the Philosophical Transactions, N^o 464.

POLYOPTRUM, formed from *πολυ*, *much*, *many*, and *οπτικαι*, *I see*, in *Optics*, a glass through which objects appear multiplied, but diminished.

The polyoptrum differs both in structure and phenomena from the common multiplying-glass, called *polyhedra*.

POLYOPTRUM, *Construction of the*.—In a glass plain on both sides, A B (*Plate XVII. Optics, fig. 14.*) and about three fingers thick, cut out spherical segments, scarce a fifth part of a digit in diameter.

If then the glass be removed from the eye, till you can take in all the cavities at one view, you will see the same object, as if through so many several concave glasses, as there are cavities, and all exceeding small.

Fit this as an object-glass in a tube A B C D, whose aperture, A B, is equal to the diameter of the glass, and the other, C D, is equal to that of an eye-glass, *e. gr.* about a finger's breadth. The length of the tube, A C, is to be accommodated to the object and eye-glass, by trial. In C D fit a convex eye-glass, or in lieu of it a meniscus, having the distance of its principal focus a little larger than the length of the tube; so that the point from which the rays diverge after refraction in the object-glass may be in the focus. If then the eye be applied near to the eye-glass, a single object may be seen repeated as often as there are cavities in the object-glass, but still diminished.

POLYOSTEON, a name given by authors to that part of the foot which consists of a great many bones.

POLYOZUS, in *Botany*, a genus of Loureiro's, named, in allusion to its numerous branches, from *πολυς*, *many*, and *κος*, *a knot*, or *branch of a tree*. Lour. Cochinch. 74.—Class and order, *Tetrandria Monogynia*. Nat. Ord.

Gen. Ch. *Cal.* Perianth tubular, four-toothed, short. *Cor.* of one petal; tube short; limb four-cleft, reflexed. *Stam.* Filaments four, reflexed, shorter than the corolla, inserted into the mouth of its tube; anthers oblong, erect. *Pist.* Germen roundish; style thread-shaped, longer than the corolla; stigma large, cylindrical, acute, emarginate. *Peric.* Berry formed out of the calyx, roundish, fleshy, of one cell. *Seeds* two, roundish.

Ess. Ch. Calyx four-toothed, becoming pulpy. Tube of the corolla short; limb in four segments. Berry fleshy, of one cell, with two seeds.

1. *P. bipinnata*. Cây Trâm ná of the Cochinchinese.—Leaves doubly pinnate. Clusters lateral.—Native of the woods of Cochinchina. A large tree, with abundant spreading branches. Leaves doubly pinnate, of numerous pairs of small, ovate, pointed, entire, shining leaflets. Clusters axillary, short, of many small greenish-yellow flowers, many of which are neuter, whose calyx and corolla are similar to the perfect ones. Berry middle-sized, brown, not eatable. The wood of this tree is white and heavy, not beautiful, but of great use in supporting bridges, as it suffers little either from wet or from worms.

2. *P. lanceolata*. Am fan cung of the Chinese.—Leaves lanceolate. Clusters terminal.—Native of the neighbourhood of Canton in China. A shrub, without spines, four feet high, with spreading branches. Leaves opposite, stalked, lanceolate, entire, smooth. Clusters terminal, compound. Flowers reddish. Calyx four-toothed, becoming a berry. Corolla funnel-shaped, its limb in four spreading segments, the length of the tube; the orifice filled with copious wool, and bearing the stamens. Stigma emarginate. Berry roundish, very small, of one cell, with two seeds. *Pavetta caffra*, Linn. Suppl. 121, agrees better with this genus than with *Pavetta*.

Such is the whole of Loureiro's account, except that he mentions *Roubamon* of Aublet, Guian. 93. t. 36, as scarcely differing from the above description. We are not able to refer this description to any plant with which we are acquainted, but there seems great reason to suspect that his two species do not really belong to one genus; of which he betrays a suspicion, by giving a particular account of the fructification of the second. Aublet's *Roubamon*, though described by Schreber as a genus, by the name of *Lasiostoma*, appears to be, as Jussieu makes it, a tetrandrous species of *Strychnos*.

POLYPARA, so termed by Loureiro, from *πολυς*, *many*, and *pario*, to bear or bring forth, an inadmissible hybrid word, referring to the great number of florets produced by one corolla. The genus and the name are superseded by the *Houttuynia* of Thunberg, which, according to the avowal of Loureiro himself, is the very same plant. See HOUTTUYNIA.

POLYPE, or POLYPUS, in *Zoology*, a small fresh-water insect, belonging to the genus of Hydra, in the class of Worms, and order of Zoophytes, in the Linnæan system, the *Hydra grisea*; which, when cut into a number of separate pieces, becomes in a day or two so many distinct and separate animals; each piece having the surprising property of producing a head and tail, and the other organs necessary for life and all the animal functions.

The first discovery of this animal was owing to M. Leeuwenhoek, who, in the year 1703, presented to the Royal Society of London a description of it, and an account of its uncommon way of producing its young; but the discovery of its amazing property of reproducing the several organs of its various pieces, was not made till the year 1740, by M. Trembley, at the Hague. See Martyn's Abr. Phil. Transf. vol. ix. p. 17, &c.

The production of its young is, indeed, different from the common course of nature in other animals: for the young one issues from the side of its parent, in form of a small pimple or protuberance, which, lengthening and enlarging every hour, becomes, in about two days, a perfect animal, and drops from off its parent, to shift for itself: but before it does this, it has often another growing from its side; and sometimes a third from it, even before the first is separated from its parent.

M. Trembley observes, that there is no distinguished place in the body of the polypus, by which the young are brought forth. He has seen some of them that have produced young ones from all the exterior parts of their bodies.

They breed quicker in hot than in cold weather; and what is very extraordinary is, that there never has yet been discovered among them any distinction of sex, or appearance of copulation; every individual of the whole species being prolific, and that as much if kept separate, as if suffered to live among others.

If the method of this little animal's producing its young be very amazing, its reproduction of the several parts, when

POLYPE.

cut off, is much more so. The discovery of this was perfectly accidental; for M. Trembley, who had often met with the creature in the water, and from its fixed residence in one place, and some other observations, not being able to determine whether it were an animal or a vegetable, made the trial by cutting it asunder, when, to his amazement, he found, that in a few days each of those pieces was become a perfect animal, the head part having shot forth a tail, and the tail a head.

A thousand other trials, by cutting the animal in different manners, first by M. Trembley, and afterwards, at his request, by Monf. Reaumur, and Bernard de Jussieu, at Paris, and Mr. Folkes, Mr. Baker, and the other naturalists in England, were the result of this; and all succeeded in the same manner by those who repeated them.

It is not easy to say what is the size of this creature; for it can contract or extend its body at pleasure from the length of an inch or more, and the thickness of a hog's bristle, to the shortness of a single line, with a proportionable increase of thickness. Its body is round and tubular, at one end of which is the head, surrounded with six, eight, ten, or more arms, with which it catches its prey; and at the other, the anus and tail, by which it fixes itself to any thing it pleases.

There have been many different species of it discovered, the most elegant of which, the *polype a panache*, or plumed polype, of M. Trembley, seems much to resemble the wheel-animal (so called from having the appearance of two wheels in its head), which Mr. Leeuwenhoek discovered living in a sheath or case, and affixed to the roots of duckweed.

All the species are found in clear and slowly running waters, adhering by the tail to sticks, stones, and water-plants, and live on small insects. They are easily kept alive a long time in glasses, often changing the water, keeping the glasses clean, and feeding them with a small red worm, common in the mud of the Thames, or with other small insects.

The creature has its name from the Greek *πολυ*, many, and *πυ*, a foot, signifying an animal with many feet; but a more apposite one might have easily been invented, since it has in reality no feet at all. What were originally taken for feet, are what have since been called its horns, and of late more properly its arms, their office being to catch its prey.

This animal is first of a worm-shaped figure, and of the same kind of tender substance with the horns of a common snail; it adheres by one end, like a sucker, to water-plants and other substances; the other end, which is the head, is surrounded by many arms or feeders, placed like rays round a centre; this centre is its mouth; and with these tender arms, which are capable of great extension, it seizes minute worms, and various kinds of water-insects, and brings them to its mouth; and often swallows bodies larger than itself; having a surprising property of extending its mouth wider, in proportion, than any other animal. After its food is digested in its stomach, it returns the remains of the animals upon which it feeds through its mouth again, having no other observable emunctory. In a few days there appear small knobs or papillæ on its sides: as these increase in length, little fibres are seen rising out of the circumference of their heads, as in the parent animal; which fibres they soon begin to use for the purpose of procuring nourishment, &c. When these are arrived at mature size, they send out other young ones on their sides in the same manner; so that the animal branches out into a numerous offspring, growing out

of one common parent, and united together and disposed in the manner represented in a figure. Each of these provides nourishment not only for itself, but for the whole society; an increase of the bulk of one polype by its feeding, tending to an increase in the rest. Thus a polype of the fresh-water kind becomes like a plant branched out, or composed of many bodies, each of which has this singular characteristic, that if one of them be cut in two in the middle, the separated part becomes a complete animal, and soon adhering to some fixed base, like the parent from which it was separated, produces a circle of arms; a mouth is formed in the centre; it increases in bulk, emits a numerous progeny, and is, in every respect, as perfect an animal as that from which it was severed.

The several strange properties recorded of this animal, though very surprising, are, however, none of them peculiar to it alone. The Surinam toad is well known to produce its young not in the ordinary way, but in cells upon its back. Mr. Sherwood has also discovered the small eels in four parts to be each, without exception, full of living young ones. And as to the most amazing of all its properties, the reproduction of its parts, we know the crab and lobster, if a leg be broken off, always produce a new one: and M. Bonet, M. Lyonet, Monf. de Reaumur, and Mr. Folkes, have all found on experiment, that several earth and water worms have the same property, some of them even when cut into thirty pieces. The *urtica marina*, or sea-nettle, has been also found to have the same: and the sea star-fish, of which the polype is truly a species, though it had long escaped the searches of the naturalists, was always well known by the fishermen to have it also. See REPRODUCTION.

POLYPE, Cluster, the name of a species of small insect of the polype kind, called by the French naturalists *polype en bouquet*.

There is found on several of the water-plants, and on other substances, as sticks, boards, and the like accidentally fallen into the water, a whitish substance, that at first sight appears to be only a sort of mouldiness; but if the bodies on which this is found be put into a vessel of clear water, and the matter examined with a magnifying glass, it is soon seen that this whitish substance is really a vast number of small animals, which are almost continually in motion. When this is brought before the microscope, the form and structure of the creatures are very evidently distinguished, and they are found to be minute roundish creatures, severally affixed to the end of a sort of stem or tail; and many of the stems are so interwoven and united together, that they form clusters, which have occasioned the name of a cluster-polype to be given to the animal, though in itself it is really and properly single from the beginning. There are several species of polype of this minute kind, that cluster themselves in this manner together; and according to these and other circumstances, the clusters are found larger or smaller, and more or less complex.

The smaller clusters should always be chosen for observation, as in the larger the bodies of the several animals that compose them are apt to hide and obscure one another; but the most beautiful and accurate of all observations is to be formed when they are single, as they are sometimes found; and this is the only opportunity of seeing distinctly in what manner the clusters are formed. One of these single animals is not in length above the two hundred and fortieth part of an inch, and is of a shape nearly resembling that of a bell: the anterior part of this generally appears open when it presents itself properly; and the posterior part is fixed to the stem or pedicle, by the other extremity

extremity of which the creature fastens itself to any solid body that it meets with. The body is of a brownish colour, except at the smaller end, which, as well as the tail, is whitish and transparent; and when the anterior part is open, there may always be perceived about its edges a very lively motion; and when the creature presents itself in a better manner, there may be seen on either side of the edges on the anterior part, somewhat resembling the wheels of a mill, continually moving with great velocity.

These creatures are able to contract their bodies, and often do it very suddenly, especially if any thing disturb the substance on which they are fixed: when they are thus contracted, the edges of their anterior parts are drawn just into their bodies: and when the fright is over, it is a very agreeable sight to behold these edges turning out again, and putting themselves in motion as before. If the edges of the anterior parts of the bodies of these animals be strictly observed while in motion, the water about them will be found to be full of extremely minute round bodies, which are brought together by means of that motion, and serve the creature for its food: these may be often seen going down into the cavities of the body of the polype, and that very suddenly, as if forcibly driven down; and when swallowed too voraciously, are often thrown up again. These observations are best made when a small cluster of the polypes are examined together.

If these polypes are kept some time in the rain-water, they, by degrees, lose their brown colour, and become white and transparent throughout, except that a few spots of a dusky colour remain in their bodies; but if, after this, they are removed into other water, of the same kind with the first, but newly taken out of the ditch, they in a little time recover their brown colour. When they become white, they plainly appear to be in a sickly condition, and cease to multiply; but when they have fresh water and recover their colour, they immediately begin to multiply again.

These creatures are not absolutely and immoveably fixed to the bodies on which they are placed, but they can at pleasure quit them and swim about: in this swimming state they are always found single and not in clusters; and they do not then appear in the same form as when they are fixed and open at the anterior ends. When they have swam about as long as they please, they either return to their clusters from which they separated themselves, or affix each singly to any thing they meet with: and this is a circumstance that merits to be carefully watched, because it is by means of this that we see in what manner the creature multiplies itself and the clusters are formed.

As soon as a single animal of this kind is fixed to a stick, a stone, or any other substance, it begins to lengthen its stem or tail, which, though very short while swimming, and when first fixed, very soon becomes of its pristine length while in the cluster; and after this the creature begins immediately to multiply by the most amazing means in the world, that is, by splitting itself to pieces lengthways. The first motion towards this operation is the drawing in the lips or edges; this is soon done, and the body then loses its bell-like shape, and becomes round; the motion which was before perceived at the edges ceases, and there is only a slight tremulation to be seen within the body; after which the anterior part of the body becomes flat or broad, and the whole body shortens in proportion; and soon after this the whole body gradually splits itself regularly into two, from the centre of the anterior part to the centre of the hinder end, where it joins the tail or pedicle, and there soon appear two round and perfect bodies joined to that pedicle

which before supported only one. The anterior parts of the two bodies soon begin to open, and gradually shew their edges, which perform the same motion the single one did before. The motion is at first very slow, but it grows quicker by degrees as they open; and when they are perfectly expanded, it is as quick as it was in the original single body; it is at this time that the two bodies may be esteemed quite perfect. They are at first indeed less than the original polype, from which they were formed, but they grow to the same size in a very little time: the whole operation of dividing itself, takes up the creature about an hour: but to form a true idea of the manner in which it is performed, there must be many observations made, and the creatures must be examined in all views and lights while about it.

The lips of these polypes, when closely examined, appear to be composed of four or five transparent bands, all of which have an undulatory motion. And when the newly divided polype is but slow in its motions, it is easy to discover that what afterwards appear to be like the wheels of a mill, are, in reality, only four or five oblong bodies, resembling a sort of figures which alternately bend down, and extend themselves every instant. These are fastened to the bands of the lips on each side of the mouth; and when they are put into swift motion in the time of the full growth and vigour of the animal, they are not to be distinguished as to form, nor can their motion be otherwise discovered than by its swiftness, which makes it resemble the quick turning of a wheel.

When the separation of the body of a single polype of this kind is complete, one sees two regular and perfect bodies adhering side by side to the same pedicle, but soon after each of the new-formed bodies begins to shew a pedicle of its own; these grow in a day's time to a moderate length, and unite at their bottoms to the end of what was the original single pedicle of the body while but one; they grow to this in the manner of the branches growing to the trunk of a tree.

Twenty-four hours after the separation of the original body into two, these two begin to separate themselves in the same manner, each into two again; and these, after a like time, again separate: each of these separated animals has its own tail formed in a like period of time with the first; and the consequence is, that the first separation producing two, the second gives four, the third eight, and so the sixth, sixty-four, the seventh, one hundred and twenty-eight, and so on; by which means a single animal, in a very few days, forms out of itself an immense cluster, each animal of which is perfect in itself and independent of all the rest, and can, when it pleases, swim away and form a new cluster. They will multiply as fast in glass jars, as in their native free state in the waters, and clusters of them, begun near one another, will often join in such a manner as to form one complex cluster of an inch diameter: from these several clusters there detach themselves single polypes from time to time, which go off, and fastening themselves to other bodies, become the authors of new progenies.

The original branch or stem of the first polype remains always in the centre of the cluster; but it is of no use, never afterwards having any body fixed to it.

There are, besides this species here described, four other known kinds of polypes, which divide themselves in the same manner by splitting into two lengthwise: those which come nearest to the first are slenderer, and their stems are more transparent. They are of a blueish colour, when many of them are seen together, and their stems or tails very aptly resemble spun glass. When this species is perfectly formed,

the motion of its lips is less distinct than in the other; but it may be discovered in the same manner while they are newly separated, and are but growing toward perfection, when it gradually becomes less and less distinct.

Another species of these polypes is smaller than the last, but more open at the mouth and deeper hollowed; and these are particularly distinguished from all the others, by having a motion in their stems and branches, which all the others want. The stems draw themselves up, and shorten all at once into the appearance of a spiral screw, and in a moment can dart themselves straight out to their full length again. All these multiply very speedily, but they have all enemies that destroy them in a very terrible manner, whole clusters making but single mouthfuls. The funnel-polypes are nearly allied to these creatures. Phil. Transf. N^o 474, vol. xliii. p. 169, &c. and vol. xlv. p. 627, &c.

POLYPE, *Funnel*, described by M. de Reaumur and M. Trembley under the appellation of *Tunnel-like polype*, a name given by naturalists to a small water-insect, in some respects approaching to the nature of the cluster-polype.

The funnel-polype nearly resembles a funnel, from which it has its name. It is long and hollow, and very wide at the anterior end. These little animals are of three species, a green, a blue, and a white one: they are all too minute for the observation of the naked eye, they must be viewed with great caution, and in several different directions and attitudes, before their true form can be discovered; and their anterior end, particularly when carefully observed, is of a much more compound structure than might at first be imagined; there may always be observed round the edges of this part a sensible motion, resembling that of an indented wheel, or rather that of a screw turned very nimbly about. These, though they approach to the shape of the cluster-polypes, and resemble them in their having this motion about the mouths, yet never have any tendency to form clusters, but are ever found loose and single. There is always a number of little round bodies, which seem to be animals of a very minute size, swimming about in the water in which these polypes live; and these are continually drawn into the mouths of the polypes, and serve them for food.

The manner of these creatures' propagating themselves is very amazing; they do it by dividing their own body into two; but this is not done longitudinally, as in the cluster-polypes, nor transversely, but diagonally from the edge of the head to the opposite edge of the tail; so that of the two thus formed out of one, the one has a head and no tail, the other a tail and no head; but these deficiencies are soon made up, and the head soon grows out of one, and the tail out of the other.

M. Trembley, in his account of this insect, calls that of the two which has the old head, the *superior* polype; that which has the old tail, the *inferior*. The first particulars observable in a funnel-polype that is going to divide, are the lips of the *inferior* polype, or those transparent edges, that are so very conspicuous in the creature when perfectly formed. These new lips first discover themselves upon the polype that is going to divide, from a little below the old lips to about two-thirds of the length of the polype, reckoning from the head; but these new lips are not disposed in a straight line, according to the length of the polype, but run sloping near half way round about. These lips are distinguished by their motion; but it is to be observed, that this motion is at first very slow, and requires an attentive eye and good glasses to discover it.

That portion of the body of the polype which is bounded by these new lips, then gathers up itself, and these lips in-

sensibly draw close together, and finally, they close themselves. By this means there is found a swelling at the side of the polype, which is found on close examination to be the head of the new polype, bounded by the lips before mentioned. Before this swelling is become very remarkable, it is easy to discover the true polypes that are forming themselves; and, after this, when the swelling is greatly increased, these two distinct animals will be found joined to one another only by a very small part of their bodies. The *superior* polype, in this case, no longer adheres to the *inferior* one but by its posterior extremity, which is still fixed on one side of the *inferior* one. The *superior* one then begins to make motions, which tend to the separating itself from its fellow; and these soon finish the work, and he becomes perfectly disengaged, and swims away whither he pleases, and soon fixes on some other place. The *inferior* polype remains fixed in the place where both were before, and becomes a perfect animal; and the *superior* one, after taking a tour in the water, sometimes returns to the old place, and fixes itself by the tail to the body of the inferior one. All these animals are extremely minute, and are not to be seen distinctly, much less are their operations observed without the help of glasses; and as there is no taking them out of the water to bring them before the microscope in the common way, without absolutely destroying them, M. Trembley, who has observed them with more accuracy than perhaps any other person ever did, has contrived to view them in a glass vessel, in their own water, by bringing them so near the sides of the glasses, that the microscope glasses are able to reach them properly from the outside. The substances on which they are fixed, are to be brought close to the edges of the vessel, by means of a set of quills framed properly together; and the microscope glasses to be supported on a moveable arm made for that purpose. Phil. Transf. N^o 474, vol. xliii. p. 180, &c. and vol. xlv. p. 627, &c.

POLYPE, *Marine*, is different in form from the fresh-water polype already described, but is nourished, increases, and may be propagated after the same manner: Mr. Ellis having often found, in his enquiries, that small pieces cut off from the living parent, in order to view the several parts more accurately, soon gave indications that they contained not only the principles of life, but likewise the faculty of increasing and multiplying into a numerous issue. It has been lately discovered and sufficiently proved by Peyssonnel, Ellis, Jussieu, Reaumur, Donati, &c. that many of those substances, which had formerly been considered by naturalists as marine vegetables or sea-plants, are in reality animal productions; and that they are formed by polypes of different shapes and sizes, for their habitation, defence, and propagation. To this class may be referred the corals, corallines, keratophyta, eschara, sponges, and alcyonium: nor is it improbable that the more compact bodies, known by the common appellations of star-stones, brain-stone, petrified fungi, and the like, brought from various parts of the East and West Indies, are of the same origin; to this purpose Mr. Ellis observes, that the ocean, in all the warmer latitudes near the shore, and wherever it is possible to observe, abounds so much with animal life, that no inanimate body can long remain unoccupied by some species. In those regions the ships' bottoms are soon covered with the habitations of thousands of animals: rocks, stones, and every thing lifeless, are covered with them instantly: and even the branches of living vegetables that hang into the water, are immediately loaded with the spawn of different animals, shell-fish of various kinds. And shell-fish themselves, when they become impotent and old, are the basis of new colonies of animals,

animals, from whose attacks they can no longer defend themselves. For a farther account of this system, see CORAL, and CORALLINES.

POLYPE, *Plumed*, or à *Pannache*, so called by M. Tremley, who noticed it in 1744, and denominated the "Bell-flower animal" by Mr. Arderon in 1743, a species of polype, which forms a kind of intermediate gradation between those creatures which hang in clusters and can detach themselves at pleasure, and others that are so intimately connected together that no one seems capable of moving or changing place without affecting the quiet and situation of all the rest. This species dwells in the same *general habitation* with others of its own species, from whence it cannot entirely separate itself; and yet, *therein* it appears perfectly at liberty to exert its own voluntary motions, and can either retire into the common receptacle, or push itself from thence and expand its curious members, without interfering with or disturbing its companions. These polypes dwell together, from the number of ten to fifteen, in a filmy kind of mucilaginous or gelatinous case; which, out of the water, has no determinate form, appearing like a little lump of slime, but when expanded in it resembles nearly the figure of a bell with the mouth upwards, and is usually about the length of half an inch, and a quarter of an inch in breadth or diameter. This case being very transparent, all the motions of its inhabitants may be discerned through it distinctly. It seems divided, internally, into several apartments, or rather to contain several smaller sacculi, each of which encloses one of these animals. The openings at the tops of these sacculi are just sufficient to admit the creature's head and a very small part of its body, to be thrust out beyond them, the rest remaining always in the case. The animal, however, can at pleasure draw itself entirely within the case, which is an asylum to secure it from its enemies, and an agreeable retirement in which to perform the functions of digestion, sleep, and other natural operations. It never fails to retire into this case, when any sudden motion of the water, or of the vessel in which it is placed, disturbs it; and also when it has seized with its arms any of the minute insects which serve it for food. The arms, to the number of forty, are set round the head, each being of the figure of long *f*, one of whose hooks is fastened to the head; and all together, when expanded, compose a figure somewhat of a horse-shoe shape, convex on the side next the body, but gradually opening and turning outwards so as to leave a considerable area within the outer extremities of the arms. When thus extended, by giving them a vibrating motion, the creature can produce a current in the water, which brings animalcules, or other minute bodies, with great velocity to its mouth, situated between the arms, where they are taken, if liked, or else, by a contrary current, which the creature can excite, they are carried away again: other minute animalcules, or substances lying withoutside the inclosure of the arms, being less subject to the force of the stream, are frequently seized by them, for so exquisite is their sense of feeling, that on being ever so slightly touched by any such small body, it is immediately caught and conveyed to the mouth. The food is conveyed immediately from the mouth, or opening between the arms, through a very narrow neck into a passage seeming to correspond with the œsophagus in land animals; down which it passes into the stomach, whence, after remaining for some time, it is voided upwards in small round pellets, through a gut, whose exit is near the neck, where it was first taken in. The body of this animal consists of three divisions, the uppermost containing the fore-mentioned intestines very visible after the creature has eaten,

and the other two seeming to be of no service besides that of giving the creature power of contraction and extension. The arms do not turn, like those of the common polype, capable of contracting themselves, but when the animal retires into its case, they are brought together in a curious and close order, so as to be easily drawn in. Their general figure, when expanded, is that of a cup, whose base and top are of an horse-shoe form; but they present sometimes a very different appearance, by separating into four parts, and ranging themselves in such a manner as to represent four separate plumes of feathers. Independently of the peculiar and separate motion of each of these creatures, the whole colony has together a power of altering the position, or even of removing from one place to another the bell, or common habitation of all. About ten or fifteen of these animals dwell together, forming, as it were, a little community, in one bell-like case; but when their number increases, the bell splits gradually, and two complete colonies are formed, independent of each other; one of which sometimes removes itself to another part of the vessel. It is conjectured, but not absolutely ascertained, that these single animals propagate by means of eggs. The bells, or colonies, of these animals are to be found adhering to the large leaves of duck-weed and other aquatic plants; and if water, with duck-weed in it, be suffered to remain quiet for three or four hours in glass vessels, exposed to a strong light, they will be found, on careful inspection, extending themselves out of their cases, spreading their plumes, and making an elegant appearance. These animals are extremely tender, and require no little care to preserve them. If they are daily supplied with fresh water, they will find sufficient food. Baker's Microscope, vol. ii. ch. 10.

POLYPE, *Ver.* See VER-Polype.

POLYPETALOUS FLOWERS, in *Botany*, are such as have their corolla formed of more than one piece, or petal. Such are the rose, lily, pea, and many others. (See COROLLA and PETALUM.) Some flowers, apparently monopetalous, by a partial or temporary cohesion of the parts in question, evince their truly polypetalous nature in fading, as may be seen in the natural order of *Proteaceæ*, and even in orange and lemon blossoms in some degree.

POLYPHEMA, so named by Loureiro, in fanciful allusion to the giant Polyphemus, because of the gigantic fruit, and the solitary stamen, as well as pistil, is no other than the Linnæan *Artocarpus*, or Bread-fruit, under which happier appellation this most distinct and important genus is now universally received. See ARTOCARPUS.

POLYPHEMUS, in *Mythology*, the most celebrated and the most terrible of the Cyclopes, who were deemed to be the sons of Neptune.

POLYPODES, a word used by some as the name for the millepedes.

POLYPODITES, a name given by the ancients to a wine impregnated with polypody, and sometimes for the juice of millepedes, expressed with wine.

POLYPODIUM, in *Botany*, *πολυποδιον* of Dioscorides, so called from *πολυς*, many, and *πους, ποδος*, a foot, on account of the appearance of its scaly root, creeping, by numerous radicles, superficially over the trunks of trees; a well-known genus of ferns, whose English name, Polypody, is but a slight alteration of the original.—Linn. Gen. 560. Schreb. 757. Mart. Mill. Dict. v. 3. Swartz Syn. Fil. 25. Sm. Fl. Brit. 1113. Ait. Hort. Kew. v. 5. 503. Pursh 658. Juss. 15. Tourn. t. 316. Lamarek Illustr. t. 866.—Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices*.

POLYPODIUM.

Gen. Ch. *Capsules* annulated, numerously assembled in globular masses, scattered over the back of the frond like round dots. *Involucrum* entirely wanting.

Eff. Ch. Fructification in roundish scattered dots, without any involucrum.

This is, in Linnæus, the most extensive and most difficult genus, with respect to species, of the whole tribe of ferns; but its limits are much contracted by the establishment of Swartz's *Aspidium*. The latter is characterised by having a membranous involucrum over each dot, and is admitted in Fl. Brit. 1118, though the author of that work, and of the present article, had originally, in his Essay on Dorsiferous Ferns, not ventured on this separation; because of the great difficulty of ascertaining, in many exotic species, whether there be an involucrum or not. Dr. Swartz has, nevertheless, overleaped this obstacle, and may safely challenge the corrections of subsequent enquirers. He defines 102 species of *Polypodium*, and 91 of *Aspidium*; but his list of doubtful species amounts nearly to as many as those he has determined. Six of the former, and nine of the latter, are described in Fl. Brit.; but *P. fontanum*, n. 2, proves an *Aspidium*; and *P. arvenicum*, n. 3, constitutes Mr. Brown's new genus of *Woodfia*, Tr. of Linn. Soc. v. 11. 173. Two other species of *Aspidium* are added in Engl. Bot. *irriguum*, t. 2199, and *crisatum*, t. 2125, which, with *fontanum* just mentioned, t. 2024, make twelve British species, in all, of that genus, while those of *Polypodium* are reduced to four.

The genus under consideration is divided into five sections, according to the structure of the frond.

Section 1. *Frond simple*. Forty species, none British.

P. piloselloides. Mouse-ear Polypody. Sw. n. 1. Linn. Sp. Pl. 1542. Ait. n. 1. (Lingua cervina minima repens et hirsuta; Plum. Fil. 103. t. 118. Petiv. Fil. t. 10. f. 5.)—Fronds undivided, hairy; barren ones ovate; fertile lanceolate. Dots solitary. Shoots creeping.—Native of old trunks of trees, and mossy rocks, in the West Indies. The creeping, thread-shaped, hairy *shoots* are repeatedly branched, spreading widely, and throwing up scattered, simple, hairy *fronds*, on hairy *stalks*. Such of the *fronds* as are not destined to bear fructification are elliptical, obtuse, scarcely above an inch long; the rest are twice or thrice that length, lanceolate and acute. A row of about six large, hairy, orbicular masses of *capsules* stands on each side of the midrib.

This is one of a very curious tribe of Polypodys, remarkable for their widely creeping hairy *shoots*, and for a great diversity of form and proportion in the *fronds* of each species, as may be seen in Plumier's figures. Most of this section are natives of the East or West Indies, or of Japan.

Section 2. *Frond pinnatifid*. Twenty-eight species.

P. vulgare. Common Polypody. Sw. n. 57. Linn. Sp. Pl. 1544. Fl. Brit. n. 1. Curt. Lond. fasc. 1. t. 68. Engl. Bot. t. 1149. Bolt. Fil. 32. t. 18. Woodv. Suppl. t. 271.—Frond pinnatifid; its lobes oblong, obtuse, somewhat ferrated. Root scaly.—Common throughout Europe on walls, roofs, old trees, &c.; generally found in fructification, when full-grown. The thick *roots* are clothed with long, chaffy, rusty or golden scales. *Fronds* erect, a span high, including their stalks, rather glaucous beneath, with large golden copious dots of *capsules*. Tournefort strangely erred in denying the existence of a ring to these *capsules*. *P. cambricum* of Linnæus is a jagged, or doubly pinnatifid, barren, large variety.

P. Struthionis. Ostrich-plume Polypody. Sw. n. 64. Linn. Sp. Pl. 1545. (*P. crispum*, *struthionis pennam* re-

ferens; Plum. Fil. 64. t. 82. Petiv. Fil. t. 3. f. 8.)—Frond deeply pinnatifid; its lobes elongated, horizontal, parallel, linear, pointed, undulated.—Gathered by Plumier in a valley in the quarter of *Leogane*, in Hispaniola; nor do we find reason to believe that any other botanist has ever met with this singularly elegant and stately fern. We have not seen a specimen in any herbarium. Linnæus adopted it from Petiver, but has cited a wrong plant of Plumier, whose work he had not under his inspection while writing the Species Plantarum. The whole figure of the *frond* resembles an ostrich feather, except in being more flat altogether, though each segment is wavy. Plumier says he could find no dots of seeds on this species; but that its edges were bordered with an elegant little black cord. Surely this renders the genus doubtful at least, and is more indicative of *Pteris* than of *Polypodium*. We mention the plant here, not only for its singular beauty and rarity, but to point out this uncertainty, and to correct the above error of synonymy.

Section 3. *Frond pinnate*. Seventeen species.

P. crenatum. Crenate Polypody. Sw. n. 75. Ind. Occ. 1661. (Lingua cervina, rotundius crenata; Plum. Fil. 93. t. 111. Petiv. Fil. t. 6. f. 14. Felix latifolia, non ramosa, rotundius crenata; Plum. Amer. 7. t. 10.)—Frond pinnate; leaflets imperfectly opposite, somewhat stalked, elliptical, pointed, crenate. Dots accompanying the transverse veins.—Found by Plumier in Hispaniola, and by Swartz in the inland woods of Jamaica. A noble fern, whose *stalks* are erect, angular, one or two feet high. *Fronds* nearly as long, of a few very large *leaflets*, beset with a row of small dots of *capsules*, on each side of every transverse vein.

Section 4. *Frond bipinnatifid, or bipinnate*. Eleven species.

P. Phegopteris. Pale Mountain Polypody. Sw. n. 92. Linn. Sp. Pl. 1550. Fl. Brit. n. 4. Engl. Bot. t. 2224. Bolt. Fil. 36. t. 20.—Frond pinnate; leaflets lanceolate, pointed, pinnatifid, combined at the base; the lowermost pair deflexed.—Native of open stony mountainous places in the north of England. Linnæus says of beech woods in Europe and Virginia; but we have never met with it in or near any beech countries. The *root* is creeping. *Fronds* about a foot high, pale green, with long pale *stalks*. The drooping posture of the two lower *leaflets* constitutes the most striking character.

Section 5. *Frond more than twice compounded*. Six species.

P. Dryopteris. Tender Three-branched Polypody. Sw. n. 101. Linn. Sp. Pl. 1555. Fl. Brit. n. 5. Engl. Bot. t. 616. Bolt. Fil. 52. t. 28.—Frond ternate, doubly pinnate, spreading, drooping; segments obtuse, somewhat crenate. Root thread-shaped.—Found in shady places, about the sides of hills, in mountainous countries; as Wales and the north of England; also in Germany, &c. The *root* is black, creeping, very slender. *Stalk* smooth, nearly a foot high, slender, and delicate, bearing three elegantly drooping, tender, light green, compound *leaflets*; the middlemost rather the largest.

P. calcareum. Rigid Three-branched Polypody. Fl. Brit. n. 6. Sw. n. 102. Engl. Bot. t. 1525. (*P. Dryopteris*; Dickf. Dr. Pl. 16. Bolt. Fil. 53. t. 1. *Dryopteris Tragi*; Ger. Em. 1135.)—Frond ternate, doubly pinnate, erect, rather rigid; segments obtuse, somewhat crenate. Dots confluent.—Native of mountainous heaths, on a calcareous soil; abundant about Matlock bath, Derbyshire. It passed for a variety of the foregoing, till the publication of the Flora Britannica. If we remember right it was Mr. T. F. Forster who by culture first noticed its

different aspect. Indeed its upright, more rigid, habit; somewhat duller green; and paler, confluent masses of *capsules*, all indicate a specific difference. This species appears to be likewise a native of Germany.

POLYPODIUM, in the *Materia Medica*, the male polypody, or common male fern, is a native of Britain, and grows about the borders of woods near rivulets, and in stony rocky places.

The root has been greatly celebrated for its effects upon the tape-worm, or *Tænia lata*, of Linnæus; and this vermifuge power of fern-root seems to have been known to the ancients; and is since commended by different practical writers. Yet notwithstanding the virtues of this root are thus recorded, its use was very generally neglected till some years ago. Madame Noufer, a surgeon's widow in Switzerland, acquired great celebrity, by employing a secret remedy as a specific in the cure of the tape-worm. This secret was thought of such importance by some of the principal physicians in Paris, who were deputed to make a complete trial of its efficacy, that it was purchased by the French king, and afterwards published by his order. The method of cure has been stated as follows: after the patient has been prepared by an emollient clyster, and a supper of panada, with butter and salt, he is directed to take in the morning, while in bed, a dose of two or three drams of the powdered root of male fern. (The dose for infants is one dram.) The powder must be washed down with a draught of water, and two hours after a strong cathartic, composed of calomel and scammony, is to be given, proportioned to the strength of the patient. If this does not operate in due time, it is to be followed by a dose of purging salts, and if the worm be not expelled in a few hours, this process is to be repeated at proper intervals. Of the success of this, or a similar mode of treatment, in cases of *tænia*, there can be no doubt, as many proofs of it in this country afford sufficient testimony; but whether the fern root or the strong cathartic is the principal agent in the destruction of the worm, may admit of a question, and the latter opinion we believe is the more generally adopted by physicians. It appears, however, from some experiments, made in Germany, that the *tænia* has in several instances been expelled by the repeated exhibition of the root, without the assistance of any purgative.

The common polypody grows on old walls, stumps and roots of trees, and various shady places, fructifying from June till October. "The leaves," says Lewis, "have a weak ungrateful smell, and a nauseous sweet taste, leaving a kind of roughness and slight acrimony in the mouth. They give out their finell and taste, together with a yellow colour, both to water and rectified spirit: the spirituous tincture is sweeter than the watery; but in inspillation its sweetness is in great part destroyed, or covered by the other matter; the spirituous extract, as Cartheuser observes, being to the taste only subastringent and subacid, with very little sweetness, while the watery extract retains the full sweetness of the polypody."

The root of the polypodium quercinum, or those that grow on the oak, has been most esteemed for medicinal use, though no just reason can be assigned for this preference. By the ancients it was employed as a purgative, and thought to be peculiarly useful in expelling bile and pituitous humours; therefore much used in maniacal melancholical disorders; but to act as cathartic the root must be exhibited in its recent state, and in a large dose. Another character in which it has been recommended, and for which from its sensible qualities it seems to promise more advantage, is that of a demulcent or pectoral; thus joined with liquorice its

good effects have been experienced in coughs and asthmatic affections.

However, it is now rarely used in this country; nor have the French authors, Poissoner and Malouin, who have cited instances of its success in mania, been able to restore to it its ancient reputation in this calamitous disorder. Woodville's Med. Bot.

POLYPOGON, in *Botany*, from *πολυς*, many, and *παγων*, a beard, alluding to its unusual abundance of awns.—Desfont. Atlant. v. 1. 66. Schrad. Germ. v. 1. 192.—Class and order, *Triandria Digynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Glume single-flowered, oblong, of two nearly equal, straight, compressed, clasping, concave valves; their inner margin membranous, extended into an acute, deeply cloven point; their keel continued into a straight dorsal awn. *Cor.* of two ovate unequal valves, about half the size of the calyx; the outermost broadest, with a terminal straight awn; the inner awnless, notched at the summit; both smooth and naked at the base. Nectary of two oblong scales. *Stam.* Filaments three, capillary, the length of the corolla; anthers oblong, cloven at each end. *Pist.* Germen ovate, superior; styles two, short, divaricated; stigmas feathery. *Peric.* none, the calyx and unchanged corolla enfolding the seed. *Seed* solitary, ovate, clothed with the corolla, but not united to it.

Ess. Ch. Calyx single-flowered, of two, nearly equal, compressed, cloven, awned valves. Corolla of two valves, enclosed within the calyx; its outer one with a terminal awn. Seed invested with the unchanged corolla.

Obs. Schrader's more correct definition of the genus *Agrostis*, to which one or two tufts of hair at the base of the corolla are, it seems, essential, has induced us to accede to the establishment of the present genus; especially as habit is greatly in its favour, its character of the awned calyx strong and obvious, and its importance increased by an additional species unknown to Desfontaines or Schrader.

1. *P. monspeliensis*. Long-awned Beard-grass. Desfont. and Schrad. as above. (*Alopecurus monspeliensis* & *panicus*; Linn. Sp. Pl. 89, 90. *A. aristatus*; Hudf. 28. *Phleum crinitum*; Schreb. Gram. 151. t. 20. f. 3. Sm. Fl. Brit. 71. Fl. Græc. t. 62. *Agrostis triaristata*; Knapp. t. 23. *A. panicea*; Ait. Hort. Kew. ed. 1. v. 1. 94. ed. 2. v. 1. 148. Willd. Sp. Pl. v. 1. 363. Engl. Bot. t. 1704.)

—Awns thrice the length of the calyx. Root fibrous.—Native of moist, chiefly maritime, situations, in various parts of Europe, but rather rare in England. Dr. Sibthorp met with it in low ground about Athens. It is annual, flowering late in autumn. Root fibrous, small. Stems usually several, a foot or more in height, simple, ascending, leafy; some of them bent at the lower joints. *Herbage* pale, and rather glaucous. *Leaves* rough-edged, with long smooth sheaths. *Stipula* oblong, rough at the back. *Panicle* dense, erect, pale green, lobed and branched, of innumerable flowers, conspicuous for their long, tawny, shining, silky awns. The awn of the corolla is not longer than the valves of the calyx. We should have been glad if the authors we follow had retained *panicus* as the specific name. There are two varieties of this grass, made distinct species by Linnæus, but differing merely in luxuriance, owing to their growing in a more or less humid soil. The smaller is his *Alopecurus paniceus*.

2. *P. littoralis*. Short-awned Beard-grass. (*Agrostis littoralis*; Sm. Fl. Brit. 78. Engl. Bot. t. 1251. Dickf. H. Sicc. fasc. 16. 1. Knapp. t. 22. Ait. Hort. Kew. ed. 2. v. 1. 148.)—Awns about the length of the calyx. Root creeping.—This was first discovered in August 1777, in salt marshes on the north coast of Norfolk, by the Rev.

H. Bryant

H. Bryant and Mr. Rose; and has since been found in Essex and Kent; but in no other part of the world. Its affinity to the preceding species cannot be overlooked, but the *root* is perennial, creeping very extensively. *Stems* ascending, bent, and decumbent at their base, a little branched. *Leaves* roughish, slightly glaucous. *Panicle* purplish, much resembling the former in size and structure, but the awns of the *calyx* are scarcely so long as its valves, while that of the *corolla* exceeds its own valve in length, and extends rather beyond the *calyx*. Dr. Withering has actually figured and described, for the present species, a specimen of the preceding, sent him by some ignorant person from Wells, with a totally unfounded account of its first discoverer.

POLYPORUS, a name given by Micheli to the *Boletus* of Linnæus, expressive of the numerous pores which cover its under surface.

POLYPOSIA, a term used by the ancients to express a copious drinking of wine.

POLYPREMUM, in *Botany*, from *πολυς*, many, and *περιμνον*, a stalk, or shoot.—Linn. Gen. 56. Schreb. 74. Willd. Sp. Pl. v. 1. 623. Mart. Mill. Dict. v. 3. Pursh 99. Juss. 122. Lamarck Illustr. t. 71. Gærtn. t. 62.—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Scrophulariæ*, Juss.

Gen. Ch. *Cal.* Perianth interior, of four lanceolate, keeled, permanent leaves, internally coloured. *Cor.* of one petal, wheel-shaped; limb in four deep obovate segments, the length of the calyx. *Stam.* Filaments four, very short, in the bearded mouth of the corolla; anthers roundish. *Pist.* Germen superior, inversely heart-shaped; style short, permanent; stigma abrupt. *Peric.* Capsule ovate, compressed at the top, emarginate, of two cells and two valves, with a transverse partition. *Seeds* numerous, attached to an oblong ascending receptacle, connected below with the partition.

Ess. Ch. Calyx four-leaved. Corolla wheel-shaped, four-cleft, bearded at the mouth. Capsule superior, compressed, emarginate, of two cells. Seeds numerous.

1. *P. procumbens*. Linn. Sp. Pl. 161. Willd. n. 1. Figured in Petiv. Gazoph. t. 5. f. 6.—Native of dry pastures in North America, from Virginia to Georgia, flowering from May to August. The mouth of the *corolla* is bearded. *Pursh.* *Root* annual. *Stems* a foot long, spreading on the ground, very much branched and repeatedly forked, leafy, angular, with rough edges. *Leaves* opposite, sessile, linear-lanceolate, acute, rough-edged, about an inch long, resembling those of a *Galium*, their bases tapering, connected by a short membranous *stipula*. *Flowers* small, white, sessile, solitary in the forks of the stem, all together very numerous. The plant has the aspect of the pink tribe, to which Linnæus doubtfully referred it, principally on that account.

POLYPTOTON, Πολυπτωτον, in *Rhetoric*, a figure in which the same word is repeated in different cases, genders, or numbers, *i. e.* with different terminations.

Such is that of Cicero, pro Arch. "Sed pleni sunt omnes libri, plenæ sapientum voces, plena exemplorum vetustas."

So Virg. Æn. lib. iv. v. 28.

"Littora littoribus contraria, fluctibus undas
Imprecor, arma armis pugnent."

POLYPUS, the *Polype*, in *Zoology*. See **POLYPE**.

POLYPUS, in *Natural History*, a name given by some of the earlier writers to the thin shelled nautilus, or nautilus papyraceus. The body and arms of this creature somewhat

resemble those of the polype; it was supposed to be a species of polype enclosed in a shell, which it could quit occasionally, and go on shore to feed.

POLYPUS, in the language of *Surgery*, signifies a sarcomatous or fleshy excrescence, having a pedicle, and growing from the membrane, or lining, of various cavities of the human body. Thus, we meet with polypi of the nose, uterus, vagina, rectum, &c.

Polypi of the Nose and Throat.—These swellings have their origin in the substance of the pituitary, or mucous membrane, and may occur at any part of the whole extent of its surface; either at the entrance of the nostrils, in the fossæ nasales, in the irregularities of the ethmoid bone, or in the maxillary sinuses. Both children and grown-up persons are subject to nasal polypi, the cause of which is frequently very obscure, and even quite unknown. These swellings increase slowly, and the patients are not conscious of them until they have attained a certain size. The patient feels, at first, as if he had caught a cold, breathes with difficulty, loses, by degrees, the faculty of smelling, and perceives in one of his nostrils, seldom in both of them, a tumour, which is round, circumscribed, indolent, and of a greyish colour, inclining to red or brown; which is moveable, and causes more inconvenience in damp, than in dry weather. This swelling gradually enlarges, and at length either protrudes out of the nostril, or makes its way towards the nasal fossæ, and hangs down into the pharynx. It expands in every direction where there is most space, and least resistance to it, compressing the vomer, the ossa spongiosa, the nasal duct, and the orifice of the Eustachian tube. A polypus of the nose, or throat, whatever may be its magnitude, never has more than one root or pedicle, and the old opinion to the contrary is entirely unfounded.

The generality of surgical writers divide polypi of the nose into four kinds, according to the differences observable in the softness, hardness, and colour of these tumours. We have the *mucous*, or *vesicular* polypus; the *vascular* one, which is of a pale red colour; the *scirrhus* polypus; and that which is named *sarcomatous*. In the present place, we shall dismiss from consideration fungous diseases of the pituitary membrane, their nature having been explained in a former volume of this work. See **FUNGUS of the Antrum**.

The *mucous*, or *vesicular* polypus, so called from its resemblance to a round vesicle, is about as large as a grape stone, and of a greyish-ash colour. It is indolent, circumscribed, and never produces any serious inconvenience: it is scarcely ever single. Sometimes three or four distinct polypi of this kind are met with in the same nostril, and usually near its entrance. M. Lassus assures us, that he has never seen any situated in the posterior nasal fossæ. As the vesicular polypus is extremely soft, the slightest pressure breaks, or tears it. The extraction of it by means of forceps cannot be effected, except by small portions at a time, and the whole can be removed only by repeated introductions of the instrument. It is very apt to grow again, and its softness renders its complete extraction so difficult, that the practitioner is frequently under the necessity of cutting it away piecemeal, making use of a pair of dissecting forceps and scissars.

The *vascular* polypus is of a pale red, or sometimes of a brownish, or yellowish-brown colour, and it is the most common of all. It is soft, indolent, and moveable, with rather a broad base, and occasionally it fills the cavity of the nose completely, extending quite to the posterior nasal fossæ. It can be taken hold of with a pair of forceps, so as to admit of being entirely or partly extracted, which operation

tion is followed by a more or less considerable degree of hemorrhage.

The *scirrhus* polypus is as hard as cartilage, of which it also exhibits the colour. The strongest caustics, such as the liquid muriate of antimony, are said to be incapable of destroying it. The tumour is altogether insensible, and M. Lassus thinks the epithet *scirrhus* very applicable to it. The scirrhus polypi, which this gentleman has observed, filled the whole cavity of the nostril, to which they were likewise adherent. He considers them as incurable, since he has not succeeded in extirpating them either by excision, extraction, or caustics.

The *sarcomatous* polypus is red, fleshy, and of a dense fibrous texture: it is of considerable size, and of an oval oblong shape. As it usually hangs down behind the uvula and velum pendulum palati, which it pushes forward, it is sometimes called the polypus of the throat. It is implanted into the back part of the nasal fossæ, the ossa palati, the vomer, or the pterygoid fossa. Its attachment is seldom near the entrance of the nostril. It is furnished with numerous blood-vessels, bleeds profusely when an attempt is made to cut it out, is covered with a thin membrane, and its size never diminishes. When it descends into the pharynx, it obstructs deglutition and respiration, and renders the voice hoarse and thick.

A variety of plans has been suggested for the cure of polypi of the nose; excision, excision, extraction, setons, cauterization, and the ligature. The greater number of these methods, not attacking the root of the disease, not acting upon the insertion of the tumour, has fallen into disuse on account of their insufficiency. The method of excision, which was effected by means of astringent medicines, introduced into the nostril either in a dry or liquid form, has no action except upon such polypi as we have described under the name of *mucous*, or *vesicular*. The compression employed with the astringents, has also more effect than the medicinal applications themselves.

Excision, performed with a cutting instrument, is impracticable in a narrow tortuous space, like that of the nostrils. Extraction, by which is rather implied twisting the tumour off by means of forceps, is the only plan which is successfully adopted. The passage of a seton from the nostril into the mouth is prevented by the presence of the polypus itself, and if the introduction of this means were possible, the sound parts would be as much acted upon as the disease, and the swelling would be irritated, without being destroyed. As it is absolutely essential, in cauterization, that one precise point should be directly acted upon, without any injury being done to the healthy parts, this method is altogether hazardous, and very difficult of execution, especially when the actual cautery is that which is to be used. As for liquid caustics, they cannot be put upon the swelling, except when it is visible at the orifice of the nostril: it would be highly improper to attempt to apply them at random to any part of the tumour, which can neither be seen nor felt. Lastly, the ligature can only be applied to polypi of the throat. Such, therefore, as do not admit of being completely extracted, or twisted off, either at once, or at repeated times, are incurable, grow again, and, according to surgical writers, may even become cancerous, when irritated by violent means, on the inconsiderate application of caustic. Those indolent polypi, which ascend and descend in expiration and inspiration, which become larger in damp weather, and smaller in dry, which are attended with no head-ache, nor pain between the eye-brows, and round which a probe can be freely passed,

may and ought to be extracted. On the other hand, extensive adhesions, and the insertion of the tumour being deeply situated, may render the operation difficult, and, in the opinion of certain writers, ought to prohibit the attempt. The following is the manner of extracting a polypus from the nose. The patient should sit in an arm-chair in a good light, with his head supported on an assistant's breast. The practitioners then recommend him to snuff a little warm water up his nostril, and to blow his nose forcibly, in order to force the polypus as far out as possible. The proper forceps are then to be introduced, with which the tumour is to be taken hold of as deeply within the nose as the surgeon can manage to effect. The forceps are then to be slowly twisted round, and at the same time pulled outward, in proportion as the tumour yields and becomes elongated. Although a polypus has only one pedicle, it may have several appendices, and it sometimes happens, that merely one of these is extracted instead of the entire polypus.

It is possible, also, that there may be several distinct separate polypi in the nostril. In this case the surgeon is frequently obliged to introduce the forceps repeatedly, and to accomplish, by reiterated attempts, what he cannot do by one alone. When much bleeding arises, the surest and most ready mode of checking it generally consists in finishing the extraction of the whole of the swelling without delay. The patient may then be directed to snuff some cold water up his nose, or a mixture of vinegar and water may be injected up the nostril, and this aperture be plugged up with a dossil of lint. Should the blood run from the posterior openings of the nose into the back part of the throat, the accident may be obviated by passing from the nose into the throat a flexible bougie, or the stilet of a catheter, with a long ligature affixed to that end of it which is behind the uvula. The surgeon is to take hold of the extremity of the ligature, and then withdraw the bougie, or stilet, from the nostril. A large compress of lint is then to be fastened to the end of the ligature, which has been brought out of the mouth, and it is to be conveyed into the posterior nasal fossa by withdrawing the other end of the ligature from the nostril. In this manner an effectual degree of compression is made, and the hemorrhage is suppressed. In order to facilitate this operation, Bellocq, a French surgeon, invented a silver tube, which was a little bent, and included a flexible stilet, that could be pushed out into the back of the throat at the option of the practitioner: according to M. Lassus this instrument answers very well.

The ligature is the only means to be employed in the cure of polypi which present themselves towards the throat. Its use is attended with little pain, and it has the recommendations of not frightening the patient, and of constricting the root of the tumour, without any risk of hemorrhage. As it seldom happens that a patient is at the same time affected both with a polypus of the nose and one of the throat, the nostrils are unobstructed, and the surgeon therefore has it in his power to practise the method first suggested by M. Brasdor, member of the ancient French academy of surgery, and which several practitioners have subsequently endeavoured to simplify by some slight alterations. It may be executed as follows: the patient falling being seated in a good light, a long ligature is to be introduced through one of the nostrils down behind the uvula, for which purpose Bellocq's instrument, or a flexible bougie, is to be used. The ligature having been thus introduced, the instrument employed for passing it is to be withdrawn. Then the surgeon is to fasten to the end of the ligature in the mouth, the two extremities of a narrow silk ligature, which must

POLYPUS.

be about two feet in length, and doubled, so as to form a noose. The patient's head being now held back, the ligature, serving as a conductor to the silk noose, is to be gently drawn out of the nostril, and, in proportion as it is pulled out, the surgeon is, with his fingers, to get the silk noose as it passes behind the soft palate over the polypus. He is to continue to draw the noose out of the cavity of the nose, until he finds, from the resistance made, that the polypus is constricted as high up as possible at the place of its insertion. The two ends of the silk noose are next to be passed through a slightly curved silver tube, about six or seven inches long, which is to be introduced deeply into the nostril, and kept there the whole time of cure. A ring at the outer end of the cannula serves as a point, to which the ends of the silk ligature, after they have been sufficiently tightened, may be conveniently fastened. The silver tube is to be fastened to the patient's night cap with a ribband, and by tightening the silk twice a day, and twisting the cannula half round, the swelling becomes constricted, and falls off in the course of five or six days. Should the surgeon not succeed at first in conveying the noose over the polypus with his fingers, the noose must be drawn back towards the mouth, by means of a thread provided for the purpose, so that there may be no occasion for recommencing the operation. As it has sometimes happened, that the separation of a polypus of the throat, especially in the night time, has nearly suffocated the patient, M. Lassus is an advocate for passing a ligature through the tumour, with a long slightly curved needle, in order that the patient himself may be able to pull out the detached mass. The foregoing plan, if we can credit this last writer, was first devised by M. Dignet, principal surgeon of the Hospital S. L^ô. By him it was communicated to Default, who adopted it, and to whom it has since been erroneously ascribed. (*Journ. de Chirurgie, par Default, tom. iv. p. 283.*) The execution of this method is simple and easy, either when the operator faces the patient, or when the latter rests his head back upon the breast of the surgeon. As a polypus of the throat is not adherent to the uvula, nor soft palate, there is nothing to hinder the constriction from being made at the part where the tumour is inserted.

Polypi of the Uterus.—Polypi of the uterus were first described under the name of *môles pendantes*, or as extraneous substances. (*Fab. Hildan. cent. 2. obs. 52 et 55. Guillemeau, p. 267 de ses œuvres. Saviard, obs. 36. p. 168.*) Ruyfch was the first writer who gave a more clear account of the nature of these sarcomatous swellings, which, says he, being inserted by a pedicle, are formed in the uterus, just like polypi of the nose grow from the pituitary membrane. (*Observ. Anat. Chirurg. obs. 6 et 58.*)

It was, however, that intelligent practitioner, Levret, who subsequently illustrated this part of morbid anatomy by a large number of valuable observations. It appears from his remarks, and those made still more recently, that uterine polypi may be formed in three different situations: *viz.* 1. At some point of the inside of the uterus, and especially at the fundus of this organ. 2. In the kind of canal made by the elongation of the cervix uteri. 3. At the external or vaginal surface, or at the edges of the cervix uteri. See Levret's *Obs. sur la Cure radicale des Polypes de la Matrice et du Nez, Paris 1759, 8vo.*; et *Dissertation sur les Polypes de la Matrice, in Mém. de l'Acad. de Chir. tom. viii. 12mo.*

A polypus, growing in the cavity of the uterus, is at first soft, reddish, and of trivial size. It slowly distends the parietes of this viscus, and, after existing a certain time, acquires a round pyriform shape. It continues to increase,

and when it has attained a considerable size, it produces a slight swelling of the abdomen. By degrees, the cervix uteri becomes dilated, the os tincæ opens, and on the patient coughing, or making an exertion, the polypus slips out into the vagina, where its inferior part, which hardly sustains any compression, continues to enlarge, while its upper portion, which is surrounded by the cervix uteri, is rendered narrower by the constriction which acts upon it. Such a polypus is generally single, of a reddish colour, fleshy consistence, and fibrous and vascular texture. If left to itself, its own weight drags downward the fundus uteri, to which it is attached, and thus it often protrudes the vulva. Indeed, some polypi of the uterus of long standing have been known to become as large as a bullock's heart, and to weigh three or four pounds. In this state, the external round figure of the swelling may lead a careless practitioner to mistake the case for an inverted uterus; but it deserves particular notice, that a polypus, however great its size, is always quite incapable of reduction, and protrudes again immediately when the surgeon discontinues his efforts to get it up the vagina. Besides, it is invariably connected with a pedicle, remarkable for being much more slender than the rest of the swelling. The cervix uteri can be felt with the finger to be nearly in its natural situation, and it is equally obvious, that the tumour, which traverses it, has its origin from the fundus of this viscus.

These kinds of swellings produce different accidents, according to the place which they occupy. If the polypus be contained in the uterus, and remain there long, the inconvenience which it causes may be mistaken for the commencement of pregnancy. As the cervix uteri is not dilated, the existence of the tumour cannot be ascertained by a manual examination. The woman is troubled with colic, pains in the loins, hips, and above the pubes; she is subject to frequent bleedings, which become more and more considerable. When the polypus enters the cervix uteri, it renders this organ painful, the hemorrhage increases, and if a finger be passed sufficiently far up the vagina, a smooth slippery body may be felt protruding out of the dilated orifice. When the tumour has descended into the vagina, the patient is affected with difficulty of voiding her stools and urine, and the discharge of blood is almost incessant. When the polypus protrudes from the vagina, so as to appear in the form of a large swelling between the patient's thighs, its weight unavoidably drags downward the fundus uteri to which it is attached. This last viscus, as well as the vagina, undergoes a degree of prolapsus and inversion. Should the inversion not be considerable, the root of the polypus can be felt: should it be complete, two swellings present themselves; the lower one, formed by the polypus, being indolent and irreducible; the upper one, produced by the uterus in an inverted state, being capable of reduction and excessively painful. A polypus cannot be mistaken for pregnancy, a false conception, a prolapsus, or inversion of the uterus, or for any sort of hernial swelling in the vagina, if the practitioner will only bear in mind the symptoms peculiar to each of these cases, and not omit subjecting his patient to a careful manual examination.

There is yet another disease which may be mistaken for a polypus: it is a morbid elongation of the cervix uteri, an affection which is followed by an inversion of the vagina. In the natural state, the cervix uteri is not more than about an inch in length; but, in some women, it gradually becomes lengthened, so as to make a cylindrical body eight or nine inches long, without any perceptible alteration in the position of the uterus. An oblong, hard, sarcomatous, reddish swelling is the consequence, very much resembling the

the penis when tumefied, as it often is in severe cases of paraphimosis. (See PARAPHIMOSIS.) This tumour terminates in an oval gaping aperture, which, being in fact the os tincæ, gives issue to the menstrual discharge. If a probe be introduced into this opening, it passes along a space six or seven inches in length, before it reaches the fundus of the uterus, a circumstance proving that the disease consists altogether in an elongation of the neck of this organ, covered in part by the inverted vagina. Saviard has spoken of the disorder, under the title of "descente de matrice," as having occurred in a girl who was taken for an hermaphrodite. (Observ. 15. p. 70.) At a much later period, le Blanc, an eminent surgeon at Orleans, published several cases of this disease. (Opérations de Chirurgie, p. 412.) The affection admits of cure, even when it has attained the advanced state to which we have adverted. Such an elongation of the uterus has been mistaken for a polypus; a ligature has been rashly applied; and the patient has fallen a victim to this inexcusable error.

According to M. Levret, a polypus of large size, growing from the inside of the uterus, and partly or entirely protruding at the orifice of this organ, does not invariably render the woman who is thus afflicted incapable of conceiving; nor does it necessarily injure the growth of the fœtus, nor accelerate the period of parturition. (Mem de l'Acad. de Chir. tom. iii. p. 543.) Such cases, however, must be very uncommon, and, if they be admitted as unquestionable, it is at least certain that a large tumour, situated in the vagina, must render delivery laborious.

The observations of the latter writer also inform us, that a polypus, growing from the cervix uteri, is more frequently accompanied with a fluor albus, or an abundant serous discharge, than with an effusion of blood. From this he has inferred, that, in cases of fluor albus, a manual examination, for the purpose of detecting the cause, is as necessary as it is in instances of hemorrhage. However it may be, says M. Lassus, a woman with a polypus arising from the cervix uteri, feels about the rectum and perineum a sense of weight which hinders her from sitting down. When a finger is introduced into the vagina, a portion of the circumference of the cervix may be felt to be bent backwards in the manner delineated in plate 1, fig. 6 of Levret's *Traité des Polypes*. The finger cannot pass all round the root of the tumour, as it can when the polypus is inserted into the cavity of the uterus. A polypus, also, growing from the cervix uteri, if large, may bring on a prolapsus of this organ, but never can produce an inversion of it. *Pathologie Chirurgicale*, tom. i.

The symptoms are nearly the same when the polypus is attached to the edge of the external orifice of the uterus. This aperture is dilated: the portion of the cervix uteri, into which the tumour is implanted, is very much elongated; whilst that which faces the pedicle is in its natural state, and appears raised. The cervix uteri therefore is oblique; for a polypus always elongates the part with which it is connected. Hence, in consequence of its size and weight, it drags the uterus downward, and produces in a greater or lesser degree a prolapsus of this viscus. In M. Levret's work, plate 1, fig. 7, may be seen a representation of a polypus growing from the right edge of the orifice of the uterus, attended with obliquity of the cervix of this organ. The plates 15 and 16, of the third volume of the *Mémoires de l'Académie de Chirurgie*, also exhibit a polypus, which originated from the posterior lip of the cervix uteri, attained a large size without protruding at the vulva, and made its way backward betwixt the uterus and the rectum.

All these polypi are covered by a thickish membrane,

which is in fact the lining of the uterus, under which these swellings are said to be formed. Thus, when the pedicle is tied, it is the elongated thickened membrane of the uterus which is more or less firmly constricted. Hence the acute pain, the inflammation of that viscus, and the fatal symptoms which are apt to follow the operation of tying uterine polypi; evils which, if we are to believe Lassus, are generally ascribable to the ligature being at first too tightly applied. P. 545.

Polypi of the female parts of generation have been divided into two kinds; *viz.* uterine and vaginal. Lassus thinks this division has been made without good foundation. The swellings which are formed in the vagina, and have received the name of polypi, have not, according to this writer, any pedicle like those which grow from the inside of the uterus, or from its cervix. He states that they cannot be tied, but that they may be cut away. In his opinion, they are, for the most part, cancerous, or venereal excrescences; and some of them, he says, are swellings which are formed slowly between the vagina and rectum, and protrude into the former tube, which is afterwards more or less affected with prolapsus. These last tumours, which are hard, elastic, of middling size, protuberant in the vagina, and of the nature of steatoma, have been taken, in consequence of their colour and situation, for polypi, although they have nothing that can rightly be called a pedicle. Lassus thinks that Levret himself was thus deceived: the 27th observation in his memoir proves, when attentively perused, that the tumour which he calls a polypus, and with which a girl twelve years of age became afflicted, in consequence of a contusion of the parts of generation, was in reality formed in the cellular membrane of the vagina, which was inverted by the successive size of the swelling. The patient had the tumour till she was thirty-two years of age. (Mem. de l'Acad. de Chir. tom. iii. p. 572.) Levret applied a ligature with difficulty, and could tie only parts of the disease at a time; a circumstance which Lassus says is not surprising, as the nature of the tumour fitted it for excision.

Polypi, growing in the uterus, have sometimes been spontaneously expelled, nature of her own accord freeing herself from such excrescences after they have passed into the vagina. Then the cervix uteri strangulates the pedicle, so that the tumour perishes, and separates from the place where it first originated. It does not often happen, however, that nature thus accomplishes a cure; but art, in imitation of her, possesses the means of relieving such women as are afflicted with this disease.

They who have had children, and they who have not had any, are equally subject to the disorder, nor is the true cause of the complaint at all understood. There are also some cases, tending to prove that a polypus may be formed in the uterus of a young girl, and bring on symptoms resembling those which usually occur at the commencement of menstruation. *Deault, Journal de Chirurgie*, tom. iv. p. 276.

Two plans of destroying the pedicle of a polypus of the uterus, with a ligature as high as possible, so as to make the tumour slough, are daily adopted. The first is that proposed by Levret, which consists in putting over the polypus a noose formed of fine nealed silver wire, two or three feet long. The two ends of the wire are first to be introduced through two hollow silver cylinders, about eight inches in length, and soldered together throughout their whole extent. The noose and upper part of the instrument, from which the wire comes out, are to be conveyed along the posterior side of the vagina. The noose is to be put over the tumour, and the two ends of the wire, which hang out of the lower end of the instrument, are then to be tightened. The diameter

of the noose being lessened, in proportion as the extremities of the ligature are drawn out, the tumour is constricted, swells, and afterwards mortifies. The constriction may be augmented, by turning the instrument repeatedly round in one direction, after the wire has been fastened to the rings made for that purpose. The degree to which the instrument is to be twisted, ought to be regulated by the pain which the patient suffers, the surgeon being careful not to cause too great agony. Lastly, the instrument must be fastened with a bandage to one of the thighs, until the polypus is completely detached.

This method is easy of execution, and answers very well when the tumour is rather large and protrudes into the vagina; but as it is necessary that the introduction of the noose, which is to be put over the polypus, should precede the introduction of the instrument itself, the wire is apt to be stopped by the rugæ of the vagina, and to bend, and when the pedicle of the tumour reaches only a little way out of the os tincæ, the noose cannot be got round it.

A second plan has been devised, which consists in moving round the swelling two separate tubes, or solid long pieces of metal, so as to tie the pedicle of the tumour with a thread ligature, which either passes through the cannulæ, or through two little rings mounted on the long pieces of metal. This sort of ligature is said not to be so liable to break as silver wire. This mode of operating is that which has been practised by Herbiniaux, Default, Cullerier, and others. It is in the works of these writers that the professional reader will find a description of their respective instruments, which are also more easily comprehended when seen, than when only verbally explained.

The ligature, when applied with due tightness, extends its action a good way beyond the part which it embraces. The whole tumour is detached at the very place of its insertion, without any vestige of the disease being left. The ulceration of the uterus naturally existing after the detachment of the polypus spontaneously heals; and a thin discharge continues for a little while, which may readily be cured by suitable injections. LASSUS, *Pathologie Chirurgicale*, tom. i. chap. 78.

POLYPYRENEOUS FRUITS, in *Botany*, are such as contain several kernels or seeds.

They are thus called from the Greek *πολυ*, much, and *πυρον*, kernel or berry.

POLYSACTINODOS, in *Natural History*, a name given by Linkius, and some other authors, to those star-fish whose body is divided into more than five rays, that being the more usual and general number.

POLYSARCIA, in *Medicine*, from *πολυ*, much, and *σαρξ*, flesh, a term used by some writers to denote obesity.

Sauvages makes polyfarcia a genus in his classification, but includes under it only one species, polyfarcia *adiposa*. Nofol. Meth. class x. gen. 4. See **CORPULENCE**.

POLYSCHIDES FUCUS, a sea-plant, called in English *sea-banger*. It is one of the largest sea-plants we know, growing often to ten feet or more in length. Its root is not flat in the manner of most of the other sea-plants, but is composed of several little hooks, all which lay fast hold of the stone on which it grows: these, in some measure, resemble the tendrils of the vine, and are somewhat broad and flattened at the end, where they are fastened to the stone, though round elsewhere, and are about half an inch long. These hooks grow from a broad flattish part at the bottom of the stalk, which is often four or five inches in diameter, and is usually hollow, being composed only of two membranes considerably tough and firm, with a cavity between them; from the centre of this rises the stalk, which is often

twisted and undulated at the edges; from the top of this stalk grows the leaf, which is divided into eight or ten segments; each of which is often again divided into two. These segments are very long, and, as the plants float in the water, give it much of the appearance of a broad piece of leather cut into several thongs: these all terminate in sharp points, and their colour is a brownish-green. The nicest eye cannot distinguish the least nerve or fibre, either in the stalk or leaf of this plant; but on great numbers of these plants, that curious inquirer, M. Reaumur, found flowers of the same kind with those which he originally discovered on the common ferns: they are composed of slender filaments, not exceeding the twentieth part of an inch in length; and these were the more easy to be overlooked, as they are of the same colour with the leaves of the plant. Those plants on which M. Reaumur found these flowers were not, however, entirely covered with them; but they stood at about a twelfth of an inch distance from one another. It was in the month of July that M. Reaumur examined this plant, and at that time there were no seeds discoverable upon it; but doubtless at a proper season, and with proper care in the observer, they will hereafter be discovered as plainly in this as in many other of the sea-plants, usually supposed by authors to have wanted them. *Mem. Acad. Par.* 1712.

POLYSCOPE, a multiplying glass, *i. e.* a glass which represents one subject to the eye as if it were many; called also *polyhedron*.

POLYSPASTON, *πολυσπαστον*, from *πολυ*, and *σπασω*, *traho*, I draw, *q. d.* that may be drawn many ways, in *Mechanics*, a machine so denominated by Vitruvius, consisting of an assemblage of several pulleys, used for raising of heavy weights in a little time.

The multiplication of pulleys in the polyspaston is to very good purpose; it being demonstrated in mechanics, that the force required to sustain a weight by means of a polyspaston is to the weight itself as unity to the number of ropes, or of the pulleys, those ropes or pulleys being supposed parallel to each other. See **PULLEY**.

Hence the number of pulleys, and the power, being given, the weight that will be sustained thereby is easily found, *viz.* by multiplying the power by the weight.

E. gr. Suppose the power 50 pounds, and the number of pulleys 5, the weight they will balance is 250 pounds.

In like manner, the number of pulleys being given, together with the weight sustained, the power is found by dividing the weight by the number of pulleys: thus, if the weight be 900 pounds, and the number of pulleys 6, the power will be 150 pounds.

Dechales observes, that it is found by experience, that a moderate man, standing barely on the ground, will lift 150 pounds; whence the same man, by means of a polyspaston consisting of six pulleys, will be able to sustain 900 pounds.

The power of the pulleys will be still exceedingly increased by joining several polyspastons.

To find the number of pulleys a polyspaston is to consist of, to arise a given weight by a given power. Divide the weight by the power; the quotient is the number required.

Suppose, *e. gr.* the weight 600 pounds, and the power 150; the pulleys will be 4; whose diameters are to be all equal, supposing two of them upper, and two lower, moveable on the same common axes.

POLYSPASTUM, a powerful instrument for reducing dislocations.

POLYSPERMOUS PLANTS, in *Botany*, are such as bear more than one seed in each seed-vessel.

POLYSTICHUM, a genus of *Filices*, founded we believe

lieve by Roth, but not adopted by the leading writers on that family.

POLYSTYLE COLONNADE. See **COLONNADE.**

POLYSYLLABICAL ECHOES, those which repeat many syllables or words. See **ECHO.**

POLYSYLLABLE, from *πολυ*, *much*, and *συλλαβο*, *syllable*, in *Grammar*, a word consisting of more than three syllables.

Shuckford refers the origin of polysyllables in language to the confusion of Babel; observing, that the languages which most probably arose about this time do remarkably differ from the most ancient Hebrew, in words of a greater length than that of the original Hebrew words. The Chaldean, Syrian, Egyptian, and Arabian languages, he says, afford instances of this kind, as well as the more modern tongues. *Conn. of the Sacred and Profane Hist.* vol. i. p. 136, &c.

POLYSYNDETON, *πολυσυνδετον*, in *Rhetoric*, a figure consisting in the union of the several parts of a sentence by proper particles.

Such is, *Me præ ceteris & colit, & observat, & diligit.* In opposition to this stands *asyndeton*.

This figure adds a weight and gravity to an expression, and makes what is said to appear with an air of solemnity; and by retarding the course of the sentence, gives the mind an opportunity to consider and reflect upon every part distinctly. We often meet with this figure in Demosthenes, which very well suits the gravity of his style. Thus he encourages the Athenians to prosecute the war against king Philip of Macedon, from this consideration, that now "they had ships, and men, and money, and stores, and all other things, which might contribute to the strength of the city, in greater number and plenty than in former times." *Philipp.* iii.

POLYTHALAMIUM, in *Natural History*, a name by which some authors have called the tubuli marini concamerati, a sort of sea-shell found frequently fossil, with other shells, in Sweden, and brought over to us in the stones used for pavements, but not known in its recent state.

It is of the same general structure with the cornu ammonis, and thick nautilus, being composed of several cells or cavities, communicating with one another by means of a siphunculus or pipe; but it is usually straight, though sometimes its end is twisted exactly in the manner of the cornu ammonis.

POLYTHALAMIUS, a term invented by Breynius, to express a class of shells, the character of which is, that they are hollow shelly bodies, either straight or regularly twisted into a spiral form, always wide at the mouth, and growing narrower to the other extremity. They are divided within into several cells or chambers, which are called *thalami*, each separated from the other by a diaphragm, or partition of shelly matter. The upper or largest chamber contains the body of the animal; but all the others are perforated by a siphunculus, which gives them communication one with another, and which runs from the mouth to the very apex, growing slender all the way.

Of this class he distinguishes four genera, the orthoceros, lituus, ammonites, and nautilus. The two last of these, he observes, have been long well known to the world; the two first he gives as new, and of his own discovery.

Of the orthoceratitæ, which are stones cast in the shells of the orthoceros, there are at present distinguished nine kinds; these differ from one another principally in the position of the siphunculus, or in their external form; the cone which they describe running quicker or more gradually to a point;

or, finally, by the thalami or chambers being wider or narrower.

POLYTHEISM, from *πολυ*, *much*, and *θεος*, *deus*, the doctrine or belief of a plurality of gods. See **GOD**, **IDOLATRY**, and **JUPITER.**

It has been a subject of controversy among philosophers and divines, whether idolatry and polytheism, or the knowledge and worship of the *one* true God, constituted the first religion of mankind. Mr. Hume, in his "Dissertation on the Natural History of Religion," having endeavoured to shew, that the first men were not qualified to find out the existence and perfections of God, the sole creator of the universe, by reasoning from the works of nature, deduces from the position this conclusion, that theism was not the first religion of the human race. "If," says he, "we consider the improvements of human society from rude beginnings to a state of greater perfection, polytheism and idolatry were, and necessarily must have been, the first and most ancient religion of mankind;" and again, he pronounces it "impossible that theism could, from reasoning, have been the primary religion of the human race." To the same purpose, lord Bolingbroke observes, that "though the first men could doubt no more that there is some cause of the world, than that the world itself existed, yet in consequence of this great event, and of the surprise, ignorance, and inexperience of mankind, there must have been much doubt and uncertainty concerning the first cause.—The variety of phenomena which struck their senses would lead them to imagine a variety of causes." Dr. Leland (*ubi infra*) seems disposed to allow, that if men were left merely to themselves, without any other guide, they might be apt to imagine a multiplicity of causes and authors of the universe; and that the most conspicuous parts of it, which they might suppose to be distinct worlds, had different authors and architects. Hence this learned writer concludes, that the first men did not, probably, acquire the knowledge of God and religion by the mere force of their own reason; and therefore, that the Deity interposed, in an extraordinary manner, for their instruction. Consequently that, which in speculation is a most reasonable hypothesis, appears, from the account given by Moses, to have been true in fact; or that to supply the want of experience and observation on the part of the first parents of the human race, God was pleased, in his great goodness, to favour them with extraordinary notices and significations of his will and of their duty. It is also rational further to conclude, that they must have been led, both by a sense of duty and inclination, to communicate the knowledge which they thus received to their posterity. And the long lives of the first man and his immediate descendants, gave them a singular advantage for preserving and propagating by tradition the knowledge that was imparted to them at the commencement of their existence. It is easy to conceive, that it might, without much difficulty, be transmitted to Noah, the second father of mankind: for Methuselah was contemporary with Adam about 245 years, and with Noah 600 years; and as Noah himself was a man of eminent piety and virtue, and lived 600 years with those of the old world, he would, without doubt, take care to obtain a true information of the original principles of religion delivered to the first parents of mankind. Besides we may no less reasonably conclude, that God would make farther discoveries of himself and of his will to Noah, to be by him communicated to his descendants: and this may be justly regarded as a second promulgation of religion in its main principles to the whole human race. Accordingly we may reasonably suppose, that in those parts of the world which were first peopled after the flood, and which were
nearest

POLYTHEISM.

nearest the place where the first restorers of the human race chose to reside, what remained of acts or knowledge, after the universal shipwreck, was chiefly to be found. Thus also it might be expected, that the greatest vestiges of the ancient religion might be traced, as being nearest the fountain-head. And they that were afterwards scattered to distant parts would be apt sooner to lapse into ignorance and barbarism. The best remains of ancient history agree in this with the Mosaiical accounts; that in the eastern parts of the world, *i. e.* where Noah and his family first settled after the flood, societies and civil polities were first formed, cities built, and arts cultivated. The East was the source of knowledge, from whence it was communicated to the western parts of the world. There the most precious remains of ancient tradition were to be found. Thither the most celebrated Greek philosophers afterwards travelled in quest of science, or the knowledge of things divine and human: and thither the law-givers had recourse, in order to their being instructed in laws and civil polity. But without pursuing this digression, we may observe that religion, which first entered into the world by divine revelation, communicated by the Deity to the first parents of the human race, was delivered down by tradition to their descendants; though, in process of time, it became greatly obscured, and corrupted with impure mixtures. Thus theism, or the acknowledgment and worship of one God, although it was not the mere result of reasoning, was nevertheless the religion of the first ages; and polytheism and idolatry, so far from being the first and original religion of mankind, were the corruption of it. The farther we trace the removal of nations from the earliest ages, the more we find that they degenerated from the primitive religion. The nations which made the greatest figure in the most ancient times, were the Assyrians and Chaldeans, the Persians, Phœnicians, Arabians, and Egyptians; and there is great reason for thinking, that among all or most of these the worship of the one true God was preserved for some ages after the flood. To these might be added the ancient Chinese, the Indian Brachmans, and especially the ancient Persians, who seem to have been adorers of the true God in the earliest times. The Chaldeans and Assyrians seem to have been among the first corruptors of the true ancient religion. (Josh. xxiv. 3.) See IDOLATRY.

According to Mr. Kirwan (Transf. of R. Irish Acad. vol. xi.) the corruption of the primitive patriarchal religion arose from the cessation of the Schechinah, when mankind directed their worship to the sun, in which the deity had placed his Schechinah, and to the other heavenly bodies. This writer also asserts, upon authority no less insufficient, that the Hellenistic Greeks were the last of all civilized nations, which embraced polytheism and idolatry; and that the introduction of polytheism into Greece must be attributed solely to the Phœnicians.

The learned Cudworth observes (Intell. System. ch. iv. § 19.), that though the poets were the great depravers of the true primitive religion and theology among the Pagans, yet that they kept up the ancient tradition of one supreme Deity. Amidst the crowds of divinities which they mention, there is still in all their writings the notion of One Supreme, of whom they speak in the highest terms, and to whom they ascribe the highest divine attributes, and which are peculiar to the one true God. Several passages might be produced to this purpose from Homer and others of the Greek poets, who are followed in this particular by the Latins. See Plautus in the prologue to his Rudens, ver. 9. Virgil, *Æn.* l. x. v. 2 and 18. Horace, *Od.* xii. l. i. and l. iii. vol. iv. Cudworth (*ubi supra*) has collected other similar testimonies.

Among the illiterate and barbarous nations we also perceive traces of their acknowledgment of one supreme

Divinity. Nevertheless, this notion of a supreme Deity, which generally and for many ages prevailed, and which is so highly agreeable to reason, was at length, through the negligence and corruption of mankind, astonishingly perverted and depraved. It was covered and overwhelmed so as to be scarcely discernible under a monstrous load of superstitions and idolatries. The great number of divinities that were from time to time introduced, and the worship of which was established by public authority, turned off their attention and regards from the one true God, so that he was in a great measure neglected and overlooked, whilst they paid that worship to vain idols which was due to him alone.

The most ancient idolatry (see IDOLATRY), and that which was probably the first deviation from the worship of the one true God, seems to have been the worship of heaven and the heavenly bodies, the sun, moon, and stars. At first these were probably considered in a subordination to the Supreme, as the most glorious ministers of the Most High, and to whom the administration of things was chiefly committed; to whom therefore they paid a subordinate worship. But they afterwards regarded them as the principal deities, who had an universal dominion; and on whom mankind had their chief dependence. Thus was introduced a plurality of deities; and the knowledge and worship of the only true God was in a great measure neglected and lost. To this species of idolatry may be referred the worship of the whole compass of heaven or circumambient ether, to which divinity was ascribed, and which many of them esteemed to be the chief God; not considered merely as inanimate, but as animated with a soul, of which all the heavenly bodies are partakers.

This kind of idolatry, which the scripture calls the worship of the host of heaven, hath spread generally through the Pagan nations in Europe, Asia, Africa, and America, not only among the savage and illiterate, but the most learned and polite. Lord Herbert, in his book "De Religione Gentilium," apologizes for this idolatry, by saying, that they worshipped the stars to the honour of the supreme God.

Another species of idolatry, which began at an early period, and which very generally prevailed, was the worship of deified men or heroes. Here opens a new scene of polytheism, which produced an amazing multiplicity of gods, and continually increased.

The learned Cudworth maintains, that according to the more recondite and arcane theology of the Pagans, the three capitoline gods, Jupiter, Minerva, and Juno, as well as some others, may be understood to have been nothing else but several names and notions of one supreme Deity, according to its several attributes and manifestations.

We may here observe, that in consequence of blending the history of their heroes with their theology, the Pagan mythologist often ascribed very scandalous actions to their gods; and particularly to Jupiter, whom they regarded as the chief of them. Whilst they applied to their deities the most divine titles and attributes, they represented them with all the passions, and even vices of frail mortals: and hence they were led to speak of their deities in the most contemptuous manner. The primitive Christians looked upon the name of Jupiter as so contaminated and polluted, that they would rather endure the greatest torments, than make use of it to signify the one true God.

The most plausible apology, which is made for the Pagan polytheism, is, that the one true God was worshipped under different titles and characters: that those which are reckoned distinct deities and objects of worship, were really no more than different names or attributes of the one supreme Deity according to his various manifestations and effects. This is what the Stoics and some of the other

philosophers maintained. But these pretences of the philosophers made little impression upon the people, who had been always used to worship them as so many distinct personal divinities, and knew very well, that the public religion regarded them as such. In process of time, instead of adoring the one supreme God under his various names and attributes, these very names and attributes were now changed into so many different gods and goddesses, who were worshipped with different and sometimes with contrary rites; and they became an occasion of further polytheism and idolatry.

As the different names, so also the different symbols invented and made use of to denote the divinity, came also to be worshipped as gods; such as fire among the Chaldeans, the cow and bull among the Egyptians. And it is not improbable, that the other animal gods worshipped by the Egyptians, the sheep, goat, hawk, ibis, ichneumon, crocodile, cat, dog, &c. were at first designed as symbols and hieroglyphical characters of the supreme Deity, or some of his attributes; or, as the learned author of the "Divine Legation of Moses" supposes, they were marks of their elementary gods and heroes. But afterwards they worshipped and deified the symbols themselves, and thereby fell into the most stupid and gross idolatry, which exposed them to the ridicule of other Pagans. The same observation is applicable to the images which were erected to their deities, and which were supposed to have divine power residing in them. These very images became gods, and were worshipped as such, and had divine honours rendered to them: and this circumstance contributed very much to augment the multitude of their gods.

Their physiology also, as they managed it, was another fruitful source of polytheism. The first physiologers, being mostly poets, disguised the simple original tradition of the creation of the world by allegorical descriptions of the nature and origin of things. They turned natural objects and the parts of the universe into allegorical persons, and spoke of them as so many distinct divinities; and at the same time they mixed these physical fables and allegories with the disguised traditionary accounts of their ancient heroes. Thus the number of their gods and goddesses was strangely multiplied. Upon the same principles, divinity came to be ascribed to whatever was useful in human life. Hence it was that they called wine Bacchus, fire Vulcan, and corn Ceres, &c. Temples were also erected to mind, faith, virtue, health, concord, honour, victory, liberty; and because the force of these things was so great, that it could not be governed without a god, the thing itself obtained the name of god. Thus the qualities and affections of rational beings, and even the accidents which related to them, were personified, turned into deities, and became the objects of worship: and this honour was rendered not only to qualities and accidents that were good and useful, but to those that were bad and hurtful. At Rome a temple was erected to the fever, and an altar to evil fortune; and even lust and pleasure were consecrated, so that Voluptas, the goddess of pleasure, and Libentina, the goddess of lust, had temples erected to them. The Athenians, by the advice of Epimenides, erected a temple to contumely and impudence. Upon the whole, there was scarcely any thing in nature, which was not worshipped and deified by some or other of the Heathens. It cannot be denied, says Cudworth, that the Pagans did in some sense or other deify or theologize all the parts of the world, or things of nature. Accordingly they called every thing by the name of God, and God by the name of every thing. See MYTHOLOGY and THEOLOGY.

The learned bishop of Gloucester, in his "Divine Legation," has advanced an opinion with regard to the design and use of the Mysteries, which Dr. Leland has shewn to

be erroneous. The prelate maintains, that they were intended to detect the error of the vulgar polytheism, and to bring men to the acknowledgment and adoration of the one true God. Leland's Advantage and Necessity of Christian Revelation, vol. i. c. 8, 9. See MYSTERY.

Pagan philosophy, notwithstanding the high encomiums that have been passed upon it by its admirers, and even by some of those who have thus indirectly depreciated Christianity, was of little use for leading the people into a right knowledge of God and religion, and for reclaiming them from their idolatry and polytheism. For if the philosophers had been right in their own notions of religion, their influence on the people was very inconsiderable, because they wanted proper authority to enforce their instruction. Besides, they affected an obscurity in discoursing of the principles of their philosophy, especially when they treated of religion and divine things, which rendered them altogether unfit for instructing the people in religion. They not only disguised and concealed their principles from the vulgar, but they were themselves dark and uncertain in their judgment concerning matters of the greatest consequence. They also entertained very wrong notions concerning the Deity; and considering their errors and defects, they were not likely to succeed, even if they had really intended it, in reclaiming the multitude from idolatry and polytheism. The greatest and best of the Pagan philosophers generally expressed themselves in the polytheistic strain; and therefore, instead of leading the people to the one true God, they spoke of a plurality of gods, even in their most serious discourses. They ascribed those works to the gods, and directed those duties to be rendered to them, which properly belong to the Supreme. The censures therefore which Dr. Cudworth has passed upon the poets, may be justly applied to the most celebrated philosophers; *viz.* that they made the theology of the Pagans look aristocratically—by their speaking so much of the gods in general, and without distinction, and attributing the government of the world to them in common, as if it were managed and carried on by a common council and republic of gods, in which all things were determined by a majority of voices, and as if their Jupiter, or supreme god, were no more among them than a speaker of the house of lords or commons, or the chairman of a committee. The same learned author acknowledges, concerning the Stoics, that they often derogate from the honour of the supreme Deity, by attributing such things to the gods in common as the donors of them, which plainly belong to the supreme God. Moreover, the philosophers generally encouraged divination and the oracles. This was the case with regard to Socrates, Plato, and the Stoics; and they thus countenanced the popular idolatries and superstitions. Besides, it was an universal maxim among them, that it was the duty of every wise and good man to conform to the religion of his country; and not only did they worship the gods of their respective countries, according to the established rites, and exhort others to do so, but when they took upon themselves the character of legislators, and drew up plans of laws, and of the best forms of government, it was polytheism, and not the worship of the one true God, which was the religion they proposed to establish.

It must be owned that at the time when Maximus Tyrius, Plutarch, and Apuleius wrote, who all express themselves in a similar manner, the unity of god was far more generally known and acknowledged among the Pagan nations than before. But this was not owing to the reasoning of the philosophers, but to the light of Christianity, which then became generally diffused, and for which the Jewish revolution had prepared the way. It is needless to degrade the human intellect, or to depreciate the powers of reasoning,

in order to enhance the advantage which we derive in forming just conceptions of the perfections and providence of the Deity from divine revelation. This teaches us to reason correctly concerning the unity and attributes of God; and has done more towards preserving or recovering mankind from idolatry and polytheism, than all the efforts of the wise and learned in preceding ages of the world. How little availed the speculations of human learning and philosophy towards the accomplishment of these great objects! Do we not find in fact, that notwithstanding their instructions and illuminations, the popular idolatry and polytheism, and the many absurd and abominable rites of the Heathen superstition, still kept their ground. The philosophers never converted so much as a single village from idolatry. On the contrary, they patronized it by their maxims, and countenanced it by their practice. It is evident that whatever high opinion some have entertained of the Heathen learning and philosophy, they were unable to reform a corrupt and idolatrous world. These had been tried for many ages. "Philosophy," as Mr. Locke observes, "seems to have spent its strength, and done its utmost." And yet, after all, it was found ineffectual. Human reason, therefore, needed higher assistance. "Reason," says Leland, "may be, and has been, of great use, when under the conduct of divine revelation, and making use of the light which that affords; but when trusting to its own force, it has affected an independency, and endeavoured to strike out new paths; it has often made wild work in religion, and plunged men into atheism, scepticism, and infidelity on the one hand, or into idolatry, superstition, and numberless varieties of error on the other." If the philosophers could effect no reformation in religion, it was in vain to expect it from the priests, who were the great promoters of polytheism, and all the absurd rites of the Pagan superstition. Can it be imagined, that they would instruct the people to abandon that idolatry by which they maintained their own reputation and interest? Or, would the lawgivers and politicians, and great men of the state, attempt it? The public laws in every city and country established idolatry. Now, what other method could human wisdom devise to reform and recover mankind from their idolatry and polytheism to the right knowledge and worship of God, but the doctrines of their wise men and philosophers, the instructions of their priests, and the authority of the legislators and civil powers? But all these were found in fact and experience to be insufficient. At length Christianity triumphed over all opposition, and proved itself the "wisdom and power of God" for the destruction of polytheism and idolatry. Hence we learn, with an evidence that obviates every prejudice, and with an efficacy which overpowers all resistance, that there is one God, the object of universal worship, and one mediator between God and man, Christ Jesus. This clear and unequivocal dictate of revelation is confirmed by a variety of collateral arguments. The unity of God is deducible from his self-existence. There cannot be two or more beings existing by absolute necessity of nature; because all such beings, one excepted, may be supposed not to exist, without incurring a contradiction. It is only contingent existence that admits of diversity and multiplicity. Simplicity and unity are included in the idea of necessity. There are numberless beings who participate of perfection in an infinite variety of degrees; but there can be only *one* being, who is absolute perfection itself. There are numberless beings, who are powerful, wise, and benevolent; but there can be only *one* being, of whose nature, power, wisdom, and benevolence in necessary union, and forming one idea, are the essential attributes. It is not possible there should be two infinite beings, because they must either have several perfections or

the same; neither of which is consistent with the most obvious notion of God that he is a being of all possible perfection. The contemplation of the frame of nature leads us to ascribe its origin and contrivance, not only to design, but to unity of design. See Wilkins Nat. Rel. Locke's Fam. Lett. Price on Morals, Appendix. Clarke on the Attributes. Abernethy's Serm. vol. i. serm. v. Knight on the Attributes. Howe's works, vol. i.

POLYTHRIX, the *hair-stone*, a name given by some writers to those German agates which have received into their mass, while yet soft, either the branches of the conservæ, or other capillary water-plants, or else have thin streaks of a coarser matter frequent in them, and running in the form of hairs. See **AGATE**.

POLYTRICHUM, in *Botany*, from *πολυς*, *much*, and *τριξ*, *τριχος*, *hair*, an old name, alluding to the numerous brittle-like stalks which support the capsules.—Linn. Gen. 563. Schreb. 762. Dill. Musc. 419. Hedw. Fund. v. 2. 90. t. 7. f. 37. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 1372. Juss. 11. Lamarck Illustr. t. 874.—Class and order, *Cryptogamia Musci*. Nat. Ord. *Musci*.

Ess. Ch. Outer fringe of thirty-two or sixty-four short, flat, incurved teeth: inner a flat, transverse, orbicular, undivided membrane. Veil generally double: the outer hairy.

A genus of Mosses remarkable for their great stature, exceeding that of any others of this family, and clearly distinguished from all the rest by the structure of the fringe, even more certainly than by the rough, hairy, and usually double veil. Mr. Menzies, in Tr. of Linn. Soc. v. 4, has admirably illustrated the species of this genus, though he limits it according to the ideas of Linnæus, excluding certain species whose veil, though roughish, is simple, but whose fringe is precisely that of a *Polytrichum*, and unlike every thing else. These are *P. hercynicum*, Hedw. Crypt. v. 1. 40. t. 15. Engl. Bot. t. 1219, an Alpine species; and the common *P. undulatum*, Hedw. Crypt. v. 1. 43. t. 16, 17. Engl. Bot. t. 1220. (*Bryum undulatum*; Linn. Sp. Pl. 1582. Curt. Lond. fasc. 1. t. 70.)

Hedwig describes seventeen species of *Polytrichum*, in his Sp. Musc. 88—103. Sixteen are natives of Britain; some of them not known to Hedwig; as *P. rubellum*, Menz. Tr. of Linn. Soc. v. 4. 79. t. 7. f. 3. Engl. Bot. t. 1939; and *P. Dicksoni*, Turn. Musc. Hib. 90. t. 10. f. 2. Engl. Bot. t. 1605.

The following will serve to exemplify the genus.

P. commune. Common Hair-moss. Linn. Sp. Pl. 1573. Fl. Brit. n. 1. Engl. Bot. t. 1197. (*P. quadrangulare vulgare*, juccæ foliis ferratis; Dill. Musc. 420. t. 54. f. 1.)—Stem simple. Leaves linear-lanceolate, finely serrated. Capsule erect, quadrangular. Pedestal roundish.—Common in boggy or turfy groves and woods throughout Europe, bearing capsules with us in May and June. *Herb* perennial, forming large tufts of simple plants, matted together by the copious fibres of their very long unbranched creeping *roots*. *Leaves* of a fine dark shining green, spreading every way, copious, linear-lanceolate, acute, rigid, smooth, without a keel; their base membranous and sheathing. *Flowers* dioecious, terminal; the males pale, disk-like, surrounded by numerous short, dilated, membranous-edged leaves, and mostly proliferous from the centre. *Fruit-stalks* produced after the female flowers are faded, solitary, erect, firm, red, shining, two or three inches high; paler upwards; sheathed with several brown scales at the base. *Capsule* erect, short and thick, standing on a depressed, green, tumid base or pedestal. *Lid* depressed, yellowish, with a red crenate edge, and a short, straight, slender point. *Outer fringe* of sixty-four white-edged teeth, connected at their base. *Veil* double; the

outer of innumerable brown shaggy hairs; inner membranous, shorter, tubular, cloven at the bottom.

P. alpinum. Alpine Hair-moss. Linn. Sp. Pl. 1573. Fl. Brit. n. 7. Engl. Bot. t. 1905. (*P. alpinum* ramosum, capsulis e summitate, ellipticis; Dill. Musc. 427. t. 55. f. 4.)—Leaves lanceolate-awl-shaped, finely serrated. Capsule ovate, drooping. Pedicel turbinate. Stem branched.—Native of alpine tracts, on the mountains of Wales, Scotland, Switzerland, &c.; found by Dr. Swartz even on the lowland rocks of Sweden. The stems are three or four inches high, very slender below, copiously branched and level-topped above. Leaves brownish-green, recurved. Fruit-stalks yellowish, an inch and half high, slightly wavy. Capsule ovate, turgid, brown, soon drooping. Fringe of thirty-two teeth.

POLYTROPHOS, a name given by the Greeks to coarse bread, from its conveying much more nourishment to the body than the finer kind; which they called, by way of distinction, *oligotrophos*.

POLYZONOS, in *Natural History*, a name given by the ancients to a species of onyx, which had a dark or blackish ground, with a great number of zones.

POLZANO, in *Geography*, a town of Naples, in the province of Otranto; 5 miles S.E. of Tarento.

POLZEVERA, a part of the Bochetta or mountains north of Genoa, through which a magnificent road was made in 1778; the labour of which employed, for the space of three years, from 5 to 800 men, by the patriotic munificence of one noble family, the Cambiasi.

POLZEVERA, in *Mineralogy*, a species of compound stone, consisting of serpentine, mica, and calcareous spar, so called from the place in the mountains of Genoa where it is found.

POMA, in the *Writings of the Old Greek Physicians*, a word which has given the commentators a great deal of trouble rightly to explain.

Brassavolus says, that it means all sorts of shelly or crustaceous covering of fishes: but this is an absolute error; for even the medical authors do not extend its sense so far as that. The Greeks called all shells by the name *ostraca*, and this author attributing a different virtue to the whole shell of the purpura, sufficiently speaks this poma to have been but a part of it.

The Arabian writers were sensible of this, and rendered it by the words *adfor alhaib*, which signify fragments like nails. Serapio calls it *mucatha*, which signifies a morsel or piece of any thing cut from a solid body. The original sense in which the Greeks used the word poma, was to express the thing that closed the mouth of any vessel with a long and narrow neck. The Latins expressed this by the word *operculum*, and sometimes, as in Sulpicius Severus, by the word *umbo*.

The ancients also used the word poma to express the lid or covering of a well, or of any hole. Now the purpuræ buccina, and all those other shells which the Greeks have called *stromboide*, may in some sort be compared to narrow and deep vessels, and they have all of them a sort of poma; or, as the Latins have expressed it, an operculum, to stop the mouth of the shell, and prevent the ingress or egress of any thing at the creature's pleasure. This operculum, being what Aristotle has called *opicalimma*, is certainly also what Dioscorides means by the word poma; Aristotle has been very express in his description of it, and says that the tongue lies under it, and that all the stromboide shells gave it. The *onyx Indicus*, therefore, was only the poma, or operculum of an Indian stromboide shell, of the buccinum or purpura kind, and was of a sweet smell, and thence had the term *aromaticus*, or *odoratus*. The name *onyx* is easily accounted for, as the poma of every shell of this kind is flat and thin, and does not unaptly resemble the human nail.

POMACEÆ, in *Botany*, the 36th natural order among the Fragmenta of Linnæus, named from the apple, which belongs to it. The genera mentioned by the author are *Spiræa*, *Ribes*, *Sorbus*, *Cratægus*, *Mespilus*, *Pyrus*; to which are subjoined, in a second section, *Punica*, and in a third, *Chrysobalanus*, *Prunus* and *Amygdalus*.

POMADA, an exercise of vaulting the wooden horse, by laying one hand over the pommel of the saddle.

POMADERRIS, in *Botany*, so called by Labillardiere, from *παμα*, a covering, and *δερμις*, a skin, on account of a peculiar membranous covering to the capsule.—Labill. Nov. Holl. v. 1. 61. Ait. Hort Kew. v. 2. 23.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Rhamnif.* Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, turbinate; limb in five deep, ovate, acute, spreading, deciduous segments. Cor. Petals five, equal, obovate, concave, obtuse, spreading, smaller than the calyx, alternate with its segments. Stam. Filaments five, awl-shaped, ascending, opposite to the petals and of the same length; anthers heart-shaped, incumbent. Pist. Germen superior, roundish; style cylindrical, about as long as the stamens, three-cleft at the summit; stigmas capitate. Peric. Capsule ovate, separating into three almost membranous cells, each closed by a vertical lid on the inside. Seeds solitary, ovate, compressed.

Ess. Ch. Calyx turbinate, with five deciduous segments. Petals five, concave, opposite to the stamens. Capsule of three distinct cells, each closed by a lid.

1. *P. elliptica*. Oval-leaved Pomaderris. Labill. Nov. Holl. v. 1. 61. t. 86. Ait. n. 1.—Leaves oval, downy beneath. Heads of flowers somewhat umbellate, panicled.—Native of Van Diemen's land.—A greenhouse shrub at Kew, flowering most part of the summer. The stem is nine or ten feet high, branched, round. Leaves alternate, stalked, about three inches long and one broad; mostly entire. Flowers small, white.

2. *P. apetala*. Apetalous Pomaderris. Labill. Nov. Holl. v. 1. 62. t. 87. Ait. n. 2.—Leaves ovate-oblong, doubly serrated, downy beneath. Flowers racemose. Petals none.—Gathered by Mr. Brown on the west coast of New Holland. It flowers in our greenhouses in May.—The leaves are longer than the preceding, rusty beneath. Flowers numerous, greenish-white.

There are probably more species of this genus, some of them confounded with *Ceanothus*, from which, without fruit, they are scarcely to be distinguished.

POMARANCIO, NICOLO, in *Biography*. See CIR-CIGNANO.

POMARICO, in *Geography*, a town of Naples, in the province of Basilicata; 11 miles S.S.W. of Matera.

POMARTA, a town of Moldavia; 15 miles N.N.W. of Dorohoi.

POMATA, a town of Peru, in the diocese of La Paz; 20 miles S.E. of Xuli.

POMATIA, in *Natural History*, the name of a larger species of garden-fnail, so called from its feeding on apples and other fruit. It is originally a native of Italy, but is become of late years as familiar with us in England, as if a native with us. It is a noble remedy in consumptive decays; and a person of distinction in England having occasion to take great numbers, had several large parcels brought carefully alive from Italy, and turned loose in his garden, where they multiplied to such a degree, that the neighbouring woods and hedges soon became full of them, and they have since been propagated in many other places.

The pomatia is much larger than our common fnail, and of a paler colour: it is of a roundish figure, and has five spires or twists at the head: these are placed very close, and its mouth is large and almost circular, and has no duplica-
ture

ture or fold surrounding it, but is as thin as the rest of the shell.

POMATUM, or POMADO, a composition of apples, with lard and rose-water; used by way of unguent on many occasions, particularly for diseases of the skin, pimples, scurfs, &c. and to soften the hands, render the skin smooth, the complexion fresh, &c.

Pomatums are occasionally made with jessamins, oranges, jonquils, tuberoses, &c. *i. e.* they are perfumed with the odour of those flowers.

The best is said to be that prepared of kid's grease, pip-pins, an orange sliced, with a glass of rose water, and half a glass of white wine, boiled and strained, and at last sprinkled with oil of sweet almonds.

Dr. Quincy observes, that the apple is of no significance at all in the recipe; and that the common pomatum sold in the shops is only lard beat into a cream, with rose water, and scented with lemons, thyme, or the like.

The pomatum of the late London Dispensatory was formed by beating tried, or purified lard with rose-water, in the proportion of three ounces of the water to two pounds of the lard, till they were well mixed; then melting it over a gentle fire, and after it has stood for a little while, that the watery part may settle, pouring off the lard, and incessantly stirring and beating it about till it grows cold, so as to reduce it into a light yielding mass; and afterwards adding so much essence of lemons as will be sufficient to give a grateful smell. Some scent it with oil of rhodium; and previously digest the lard for ten days with common water, renewing the water every day, a process which does not appear to be of much use. The ointments may be tinged of a fine red colour, for lip-salves, by a proper addition of alkanet root. The faculty of Paris directs, for this purpose, twenty-four parts of the white pomatum, eight of ox's marrow, and eight of white wax, cut in small pieces, to be melted together by the heat of a water-bath; one part, *i. e.* one-fortieth of the whole mass, of powdered alkanet root to be added; the mixture stirred at times till it appears tinged of a deep red colour, and then strained through a linen cloth. Lewis.

POMAX, in *Botany*. See OPERCULARIA.

POMBAL, SEBASTIAN JOSEPH DE CARVALHO, *Marquis de*, in *Biography*, a celebrated Portuguese statesman, who is thought to have possessed more absolute power than any other minister ever did in Europe, was born in 1699, either at Lisbon or Coimbra. Little is known of his father: according to the report of some, he was merely a citizen, and of the humblest class; while others state that he was of noble extraction, and held the rank of captain in a regiment of horse. His mother was nearly related to one of the principal families in the kingdom, of the name of Mendoza. The subject of the present article was extremely well educated, and intended for the law, but the profession was ill-suited to his genius; he determined upon the army, and obtained a commission in the royal guards. He was at an early age possessed of an uncommon degree of bodily strength, accompanied with the most determined courage; but being under the dominion of his passions, he abandoned himself to pleasure, and displayed a revengeful disposition. He was, however, an agreeable companion, and ardent in every thing which he undertook. At this period the young Portuguese nobility were distinguished for the dissoluteness of their manners, and at the head of them was a brother of the king, whose boldest and most zealous supporter was Carvalho. While his conduct was applauded by his prince and other associates, it excited against him the displeasure of the sovereign, who shewed to him a marked coolness, at the same

time giving strict orders that he should be narrowly watched. Unable to endure the stigma attached to his name, he resigned his commission, and retired to Source, where he married a lady of distinction. He now felt an anxious desire to act a distinguished part on the theatre of the public, and obtained, through the interest of his uncle, a situation in the government. He was formally introduced at court, where he obtained the favour and protection of the queen. In 1739 he was appointed ambassador to the court of London, where he had a fine opportunity of displaying his diplomatic talents, and of improving himself in the other branches of knowledge necessary to a statesman. "His residence in England," says his biographer, "had undoubtedly a most decisive influence on his future administration. It was here that he became acquainted with the reciprocal interests of England and Portugal, and acquired a proper idea of the power and prosperity to which a nation may attain by industry. Here also he obtained a just notion of the mercantile system, and of the measures best calculated to support it; and these he afterwards endeavoured, with indefatigable zeal, and by the most despotic authority, to put in practice in his own country." In 1745 he was recalled to his own country, and being patronized by the queen, he was appointed by her to adjust a difference that had occurred between the pope and the empress Maria Theresa. For this purpose he went to Vienna, where he was received with every mark of distinction, and his wife dying, he paid his addresses to the young countess, Von Daun, a relation of the celebrated general of that name, and again entered the marriage state, but much against the will of the countess's family, who considered themselves disgraced by the alliance. After this, owing to the enmity of the king, he remained a considerable time unemployed, though he still retained the favour of the queen, and had likewise a warm friend in the sovereign's confessor. The king, John V., was almost entirely under the guidance of the priesthood. Though his confessor was a Franciscan, the Jesuits had acquired over him a most decisive influence; and those who wished to obtain any promotion were under the necessity of courting the patronage of this order. Carvalho, who aimed at the secretaryship of foreign affairs, left no means unemployed to secure their favour, and he acted his part so well, that he induced them to believe that they had gained a proselyte. By the death of the king, in July 1750, every obstacle was removed to his elevation at court. The queen-dowager, before the remains of the deceased king could be deposited in his grave, recommended him to her son Joseph I., who very soon appointed him secretary of state for foreign affairs, and admitted him completely into his confidence. He now assumed the character of the friend and advocate of the Jesuits, and was even, by his own wish, styled the *great Jesuit*. Joseph I. was a weak prince, who possessed neither talents nor strength of understanding. He found no enjoyment but in sensual gratification. Such was the monarch who nevertheless wished to become the reformer of his states, and who ventured to undertake the expulsion of the Jesuits, and the subversion of the power of the nobility. At the time, indeed, when Carvalho entered on his office as minister, a reform in the whole administration had become necessary. The picture drawn of the state at that period was gloomy in the extreme. "The government was without activity, and the offices of state were either unoccupied, or filled by the higher nobility and clergy; selfish and interested men, without talents, and incapable of discharging their duties with honour to themselves, or advantage to their country. The public revenues were in a state of the utmost derangement. The treasury was empty, and the sources from which it had been supplied

supplied were entirely exhausted. The whole trade of the kingdom was in the hands of the English, and the great body of the people possessed neither public spirit nor industry. The situation of the country, in regard to its foreign relations, was no less wretched and contemptible. Neither by land nor by sea, was it in a condition to provide for its internal safety." Such an aspect of things could not fail to excite the attention of an active and vigilant minister, and Carvalho soon found means of extending his activity beyond the boundaries of his own particular department, and his exertions inspired new life into those of his several colleagues. The principal object of his ministerial labours was to awaken a spirit of industry among the people, and to render the Portuguese trade more independent. In England he had formerly made himself acquainted with the principles of the mercantile system of that country, and endeavoured to introduce them into his own. The attempts which Carvalho made for the encouragement of national industry were attended with but a small degree of success, being counteracted by the natural indolence of the people, and other causes, which, he soon saw, time only, aided by a fortunate concurrence of circumstances, could remove. Some of his measures interfered with the interests of the Jesuits, and these ecclesiastics did all in their power to thwart his plans, and to decry, even in their pulpits, his reputation. But the minister was not to be deterred, and he made use of the harshest and most arbitrary measures to silence discontents, and awe the people to submission. These steps led to that formal and open war against the Jesuits with which this minister was occupied during the greater part of his administration. Without attempting to enter into a detail of these events, it may be observed, that they endeavoured to ruin him with the king, and in this they were powerfully supported by the nobility, who considered themselves excluded, chiefly by his means, from many high offices, and from all participation in the government. Carvalho's situation now became extremely critical, an host of foes being in arms against him. In the mean time an event took place which turned Carvalho's attention to objects of a different nature, and afforded him an opportunity of exhibiting his character in a very favourable point of view. On the melancholy and truly awful occasion of the earthquake at Lisbon, in 1755, he displayed the most humane and active attention to the wants of those who survived the catastrophe, and did every thing in his power to repair, as fast as possible, the misfortunes which had occurred. In this business he spared no personal efforts. Regardless of rest or refreshment, he sought no other lodging than his carriage; and in the course of forty-eight hours, his only nourishment was a little soup, which was served to him as he sat in his carriage. The services which he performed on this occasion procured for the minister universal respect: all his arbitrary acts were forgotten, and the king, who before was on ill terms with him, to convince the nation and world that the conduct of Carvalho met with his full approbation, raised him to the rank of a noble, under the title of count de Oeyras, after the name of an estate which he possessed, and treated him with the most marked respect and esteem. In the following year he was made prime minister of the country, and he now assumed a most unlimited power in every thing that related to the government. On this account great clamour was excited against him, and his measures were arraigned as arbitrary and severe. Some of these were, perhaps, rendered necessary by the licentiousness of the age; for when he authorized the officers of the police to execute on the spot the disturbers of the public peace, whom they might find in the night time in the streets, murder and robbery had become so common in the capital, that the inhabitants could

not stir from their houses in safety after the day closed in. None of his measures created so much discontent as the establishment of a company at Oporto for the exclusive sale of the Portuguese wine. The opposition which this excited he quelled by the most cruel laws, so that at length it was made a capital offence to speak or reason against the existing laws, or ordinance of the minister. His next attempt was to lower the reputation of the Jesuits in the eyes of the king, and the people at large, and he succeeded so completely, that this body of ecclesiastics began to be considered as the most wicked men, in whom no confidence could be reposed. The Jesuits were highly incensed at the proceeding, and boldly asserted, that every fact mentioned to their discredit was totally false, and that the papers circulated against them were unwarrantable and scandalous libels. In Paraguay, where their influence was very great, they caused them to be declared scandalous libels, and they exerted their influence so much in Spain, that they were publicly burnt by order of the government. At length the king of Portugal was persuaded by his minister, that his life was in constant jeopardy, and must remain so, unless the Jesuits were removed from the court. A regard to his own safety urged him, on the 16th of September, 1757, to order his own confessor, and all the rest of his brethren, about the hour of bed-time, to step into their carriages, which were waiting, and to retire to their colleges. Thus were they in a moment, and without the smallest preparation, banished from court, never more to return. The count de Oeyras, however, soon found that his triumph was not complete, and that nothing but the authority of the pope could destroy the attachment of the people in general to the Jesuits. He accordingly sent a memorial on the corruption of that body to pope Benedict XIV., who sent cardinal Saldanha, as apostolic visitor, to inquire into the truth of the circumstances alleged. By this investigation, it evidently appeared that the Jesuits, in order to enrich themselves, had not only deviated from their original destination, but disgraced the sacred character by embarking in commerce and trade: on this account they were interdicted from preaching or confessing in any part of the kingdom.

The count now attempted the improvement of agriculture, to accomplish which he did not hesitate to adopt the most violent and arbitrary measures. He caused the vine-stocks to be rooted up, that the owners of the vineyards might be compelled to cultivate corn in their stead; but the beneficial effects which this regulation was intended to produce were prevented by the clamour and opposition of his enemies. A similar fate attended many of his useful projects, which were ridiculed in order to render the minister contemptible. While he was employed in these and other pursuits of the same kind, the resentment of the Jesuits and nobility broke out in a sudden explosion, the object of which was the assassination of the king. This attempt was made in the night, between the 3d and 4th of September, 1758: it fortunately proved abortive, and the conspirators, being arrested, were tried and capitally punished. There was no doubt that the Jesuits were deeply implicated in this affair, and on that account the minister determined to put an entire end to the power of that body in Portugal. In the month of April 1759, he transmitted to the pope a letter from the king, in which it was stated, that if the Jesuits were any longer suffered to carry on their secret intrigues, the government would infallibly be overturned; and that therefore it was necessary to banish them completely from the kingdom. The pontiff strongly opposed the measure; but the count was determined to carry it into execution. On the 3d of September a decree was passed, by which the

Jesuits were declared rebels and traitors, and interdicted from remaining as a body in Portugal, or ever returning to it under any pretence whatever. At first they were determined to try their strength, and set the royal authority at defiance; but by the assistance of the military they were sent on board different transports, to the number of 1854, and conveyed to the states of the church. An offer was made to the younger brethren, that they should remain at liberty in Portugal, provided they would renounce all connection with their order; but they chose rather to share in the fate of their superiors, than comply with the terms of the minister.

During the war which broke out between Portugal and Spain, the count de Oeyras exerted himself very successfully in putting the Portuguese army and navy on a good footing, and obtained as commander-in-chief, the celebrated count de LIPPE. (See his article.) The minister now turned his attention to the encouragement of trade and commerce: he established schools of industry, in which the young were instructed in various useful arts. He also founded a school of commerce, where 200 pupils were admitted and taught the various branches of knowledge suited to their future destination; and he introduced a thorough reform in all the seminaries of the kingdom. A new institute was established for the education of the young nobility. He caused a number of schools to be opened for the children of citizens, and was particularly careful that they should be constantly supplied with able masters. A second attempt was made on the king's life in December 1768, by a disappointed mule-driver, who had served in the artillery, which circumstance led the king to pay a still greater attention to his minister, whom he regarded as his best protector. He presented him with several valuable estates, loaded him with pensions, and at length, in 1770, conferred on him the title of marquis de Pombal. During the remainder of this reign he kept the king entirely in his power; but upon the death of the monarch, in 1777, the marquis was dismissed from his office, but permitted to retain his titles and his income. He, however, soon found that he was become an object of suspicion; his papers were sealed up, and an intimation was sent to him, that he might retire to his estate in the country. This was not the chief source of his alarm, for the queen, who had always been inimical to him, ordered all those persons confined under the denomination of state prisoners, amounting to several thousands, to be set at liberty, and at the same time several of his favourites were deprived of their employments. Such was the downfall of a minister, who for twenty-six years had ruled Portugal with the most unlimited sway, and who, upon quitting his office, delivered into the hands of the queen a very large treasure, and a state, the inhabitants of which had been excited to a greater degree of industry, and where a foundation was laid for the establishment of good order, and for the preservation of security and peace. After his disgrace, the marquis de Pombal had the mortification to see the system which he had laboured with so much zeal to establish, completely overturned. He was, however, allowed to live quiet and retired in a village where he had hired a small mansion, and endeavoured, by his conduct and mode of life, to exhibit externally a spirit of resignation, which, probably, ill accorded with the genuine dictates of his heart. Towards the close of life, the marquis obtained permission to repair to the baths of Calvados for the benefit of his health, but the infirmities of age could not be alleviated by any assistance of that kind. He returned to his house, and died in the month of May 1782, in the 83d year of his age. It cannot be denied that his government was extremely beneficial to the

nation, but the arbitrary measures to which he perpetually had recourse cannot be justified, or even excused; nor will it be forgotten, that while he laboured for the public, he took care of his own interest. Gen. Biog.

POMBAL, in *Geography*, a town of Portugal, in Estramadura, containing about 3700 inhabitants; 21 miles S. of Coimbra.

POMBAS, a town of Portugal, in Estramadura; 12 miles S. of Abrantes.

POMBEDITA, JUBA, in *Ancient Geography*, a town of Asia, on the banks of the Euphrates, E.S.E. of Anetho.

POMBO, in *Geography*, a province of Africa, in the kingdom of Anziko, at the mouth of the Zaire.

POMBO Samba, a province of Congo, in the S. part of the kingdom.

POMBSDORF, a town of Silesia, in the principality of Neisse; 3 miles N.W. of Patzbau.

POME, among *Gardeners*. To *pome* is to grow or knit into a round head, somewhat like an apple.

Thus, they say, a cabbage begins to pome, &c. They sometimes use the term *to cabbage* in the same sense.

POMEGRANATE TREE, in *Botany*. See PUNICA.

POMEGRANATE, *Punica Granatum*, in the *Materia Medica*. The Greek writers, Theophrastus, Dioscorides, Hippocrates, and Galen, were well acquainted with the pomegranate; and we learn from Pliny, that its fruit was usually sold in the neighbourhood of Carthage. In England its cultivation is first dated in the time of Gerard, in 1596, but though its fruit seldom arrives at perfection in this climate, yet its large and beautiful scarlet flowers render it a desirable object of ornamental gardening. The rind of the fruit, and the flowers, including the calyces, are the parts directed for medicinal use in the Pharmacopœias. The fruit has been called cortex granati, malicorium, sidium, &c. Its smell is not remarkable, but to the taste it is bitterish and astringent. With water it yields near half its own weight of a very austere extract, but to rectified spirit it gives out very little; its astringent matter, like that of the fruit of the acacia tree, seeming to be indissoluble in spirituous menstrua. In this respect the astringency of the fruit differs from the latter, which are named "Balauftium," or "Balauftine" flowers: these are commonly taken from the double-flowered variety, and like the rind, have little or no smell, but a mild, bitterish, styptic taste. They are both powerful astringents; and with this effect have long been successfully employed in diseases, both internally and externally. Dr. Cullen observes, that the strong styptic taste of this bark, and the black colour it strikes with green vitriol, shew sufficiently its astringent power; and it is commonly supposed to be among the strongest of this kind. As at the same time it gives out such a large portion of its substance to water in infusion or decoction, it seems to be particularly fit for affording a liquid astringent; and Dr. Cullen frequently found it particularly useful in gargles, in diarrhœa, and in external applications. He has never found it to be more dangerous than others, as an internal astringent, and he doubts whether it has ever had the power of suppressing the catamenia. The dose, in substance, or in form of powder, either of the flowers or bark, is from half a dram to a dram; in infusion or decoction, to half an ounce. (Lewis and Woodville.) The red succulent pulp, contained in transparent cellular membranes of the rind, and included in nine cells, is pleasantly acid, resembling that of the orange, cooling and useful for quenching thirst, and gently loosening the belly. The ancients used the rind, as the moderns do sumach, in the preparation of leather. Conserves and syrups have sometimes been made used

of the kernels: but of the true conserve there is little fold, the preparation of it being difficult. That which ordinarily passes for it is only fugar melted down, to which the colour and sharp taste are given with cochineal, cream of tartar, and alum.

POMEGUE, in *Geography*, a small island in the Mediterranean, near the coast of France, at the entrance into the harbour of Marfeilles, defended by a tower, with a small garrison. N. lat. $43^{\circ} 16'$. E. long. $6^{\circ} 23'$.

POMEIS, in *Heraldry*, are green roundles; so called by the English heralds, who express different coloured roundles by distinct names.

The French, who content themselves to denote the different colour of the roundles, call the pomeis, *tourteaux vert*.

POMELSBRUNN, in *Geography*, a town of Germany, in the territory of Nuremberg; 5 miles E. of Herbruck.

POMERANIA, a country of Europe, bounded on the N. by the Baltic, on the E. by Pomerelia, on the S. by the duchy of Warsaw and the margraviate of Brandenburg, and on the W. by the duchy of Mecklenburg. The country is level, and has few hills; and the soil, though sandy in some parts, is in others so good, as to produce wheat, rye, barley, and oats, sufficient for the inhabitants, with a surplus for exportation. Its forests supply abundance of wood for fuel, for the construction of houses and ships, and also for the manufacture of tar and charcoal. Some parts yield turf for fuel; and those districts that do not answer the purpose of tillage, serve for grazing. The geese of Pomerania are famous for their size, and those that are dried, as well as the hams, sausages, and salmon, are reckoned the best in Germany. Situated on the Baltic, Pomerania is favourable for trade and navigation, though the coast, particularly about the Oder, is dangerous. The coasts of Hither Pomerania afford amber, but not in such quantities as those of Prussia. The whole duchy contains 68 towns; and most of the inhabitants, since the years 1534 and 1535, when the reformation took place, have professed Lutheranism, though in some parts there are Calvinists and Catholics. The ancient occupiers of this country were the Sævi and Vandals, comprehending the Goths, the Rugi, the Lemovi, and other nations. When these people quitted it, they were succeeded, about the middle of the sixth century, by the Slavi or Wendi. The first period in which the name of Pomerania occurs, is in a bull of pope Innocent, dated 1140, for the confirmation of the newly-erected bishopric of Pomerania. The appellation is said to be Slavonic, and to be compounded of the words "Po Mariski," on or near the sea, and in process of time it was extended to the country on the W. side of the Oder.

Pomerania is divided by the Oder into the Anterior or Hither Pomerania, and Hinder or Farther Pomerania; the former lying on the W., the latter on the E. side of that river. This duchy was founded by prince Suantibor in 1107, and he at his death divided his possessions among his four sons. When this family became extinct, the estates were taken possession of by Brandenburg and Poland; and in 1537, upon the death of the last duke, Boleslaus XIV., Sweden took possession of a part which had been previously gained by conquest. By the treaty of Westphalia, the Swedes were left in possession of Anterior Pomerania, with the principality of Rugen, the town of Stettin, the island of Wollin, the Oder, Frisch Haff, &c.; but after an unfortunate war, the principal part was ceded to Prussia, so that the Peene became the boundary of Swedish Pomerania. In 1807, the Swedes were deprived of the remaining part by the French. Before this event, two votes were given in

the college of princes, at the diet for Pomerania, one in the name of the king of Sweden, as duke of Anterior Pomerania, and the other in the name of the king of Prussia, as duke of Hinder Pomerania. Swedish Pomerania is said to contain about 103,000 inhabitants; its revenues scarcely exceed 140,000 rix-dollars, and are incumbered with a public debt. The governor of this country resides at Stralfund, the chief town, in which is a court of justice for military affairs: there is also a royal court of justice at Griefswald, which is the seat of an university founded in 1456; but the supreme tribunal is at Wismar. The isle of Rugen (which see) belongs to Swedish Pomerania, and has the title of principality. The chief town of Swedish Pomerania is Stralfund, surrounded on all sides with water, and maintaining a considerable trade. The population of Pomerania, according to Hoeck, is estimated at 472,957. It was surrendered to Denmark Jan. 15th 1814, in lieu of Norway, ceded to Sweden.

POMERANZA, LE, a town of Etruria; 5 miles S. of Volterra.

POMERELIA, a country bounded on the N. by the Baltic, on the E. by Prussia, on the S. by Poland, and on the W. by Pomerania, about 90 miles long and 50 broad. It was formerly a part of the duchy of Pomerania, and governed by its own princes. After some changes of masters, it fell under the dominion of Poland, and more lately became subject to Poland, and last of all was annexed to the dominions of Prussia. Its principal places were Dantzic and Stargard.

POMERIUM, in *Antiquity*. See **POMOERIUM**.

POMERIUS, JULIAN, in *Biography*, a philosophical and moral writer of the fifth century, was a native of Mauritania, who removed into France, where for some time he kept a rhetorical school at the city of Arles, and was afterwards ordained priest. He was author of many works, of which the titles of some only remain: in his treatise "De Anima," lib. viii., he maintained the gloomy notion of the materiality of the soul. Cave suspects that this was only an abridgment of a very curious work of Nemesius, "On the Nature of Man." Pomerius was also author of treatises "De contemptu Mundi ac Rerum Transitarum," and "De Virginibus Instituendis," which, as well as the preceding, are no longer extant. The only production of his still remaining, is entitled "De Vita contemplativa, five de futuræ Vitæ contemplatione, vel de actuali Conversatione," which was printed with the works of St. Prosper, and attributed to him when published in a separate form, at Cologne in 1487 and 1536, and at Paris in 1711. But the testimony of Gennadius and Isidore, which is confirmed by several ancient manuscripts, clearly proves that Pomerius was the author. Dupin has given an analysis of this work, which is said to abound in acute and just remarks, and very useful maxims, but it is not recommended by the excellence or perspicuity of its style. Dupin. Moheim's Eccl. Hist.

POMERO, in *Geography*, a town of Istria; 6 miles S.S.E. of Pola.

POMERSDORF, a town of Prussia, in Ermeland; 8 miles S. of Elbing.

POMERSFELDEN, a town of Bavaria, in the bishopric of Bamberg; 17 miles S.S.W. of Bamberg.

POMETIA, or *Suessa Pometia*, in *Ancient Geography*, a town of Italy, and capital of the Volsci. Strabo. It was taken by the Romans in one of the first years of the reign of Tarquin, and of its spoils he constructed the Capitol. Its site has been long since overwhelmed by the Pomptine marshes.

POMETIA, in *Botany*, Forst. Gen. 55, so named by Forster,

Forster, in honour of Pomet, the celebrated French writer on the *Materia Medica*. See EUPHORIA and SCYTHIA.

POMEY, FRANCIS, in *Biography*, a Jesuit, a native of Lyons, known as the author of the "Pantheon Mylticum," which was translated into English by Andrew Tooke, and given to the world as his own performance. This work, which has been known in all our best schools more than a century, was diligently revised, corrected, and greatly improved, a few years since. To this new edition, a beautiful set of out-line engravings from ancient statues has been added. Pomey, besides the Pantheon, wrote a French and Latin Dictionary, 4to.; "Flos Latinitatis;" "Libitina, or Funerals of the Ancients;" "Novus Rhetoricæ Candidatus." He died in 1673, at the age of 55.

POMFRET, JOHN, an English poet, born about the year 1667, at Luton, in Bedfordshire, was educated at Cambridge, and obtained the living of Maldon, in Bedfordshire. In 1703 he came to London for a larger living, but found bishop Compton strongly prejudiced against him, on account of four lines in his poem, entitled "The Choice," in which it was falsely said that he preferred a mistress to a wife, and before the prelate's scruples could be removed, the unfortunate candidate died, at the early age of 35. In another poem, entitled "Cruelty and Lust," he has introduced the character of the brutal Kirk with great effect and pathos. Dr. Johnson says no poem has been more frequently read than "The Choice."

POMFRET, in *Geography*, a township of America, in Windfor county, Vermont; containing 1473 inhabitants; 64 miles N.E. of Bennington.—Also, a post-town of Connecticut, in Windham county; 66 miles S.W. of Boston; containing a congregational church. Its houses are handsome, and the farms of the township are well cultivated. It was settled in 1686 by emigrants from Roxbury. The number of inhabitants is 1905.

POMIEDLUCK, a town of West Greenland. N. lat. $61^{\circ} 45'$. W. long. $47^{\circ} 30'$.

POMIGLION is a name given by seamen to the cascabel, or hindmost knob of a cannon. See GUN.

POMME', in *Geography*, a river of Louisiana, which runs into Mississippi, N. lat. $37^{\circ} 18'$. W. long. $90^{\circ} 15'$.

POMMÉ, or Pommété, in *Heraldry*. A cross pommé, or pommété, called also *trophe*, is a cross with a ball or knob, like an apple at each end.

POMMEL, or PUMMEL, in the *Manege*, a piece of brass, or other matter, at top, and in the middle, of the fiddle-bow, to which are fastened the holsters, stirrup-leathers, &c.

POMMEL is also a round ball of silver, steel, or the like, fixed at the end of the guard and grasp of a sword; to serve, in some measure, for a counterpoise.

Balzac observes, that there are still extant charters and privileges granted by Charlemagne, which were sealed with the pommel of his sword, which, ordinarily, he promises to defend with the same sword.

POMMERAYE, JOHN FRANCIS, in *Biography*, an able ecclesiastical historian, who flourished in the seventeenth century, was born at Rouen in the year 1617. At an early period he renounced all his employments in the order to which he had attached himself, that he might devote himself wholly to religious exercises and study. He died in 1687, aged 70, at the abbey of St. Germain des Prez near Paris. His principal works are, "The History of the Abbey of St. Owen at Rouen, and those of St. Amand and St. Catherine in the same City;" "The History of the Archbishops of Rouen," which is esteemed as the best of his works, and contains the celebrated remonstrance which Francis

de Harlay delivered to the king in 1658, on behalf of the three estates of Normandy; "Notes to the Collection of Councils and Synods of the Church of Rouen," which he edited in 1677 from the MSS. of father John-Anger Goden, and which work was afterwards superseded by the larger and more perfect collection of father Bessin; and the "History of the Cathedral of Rouen." Moreri.

POMMEREULLA, in *Botany*, so named by the younger Linnæus, in honour of Madame du Gage de Pommereull, (or rather Pommereuil, according to Palissot de Beauvois,) a French lady, reported to have bestowed great attention upon the natural family of grasses, to which this genus belongs.—Linn. Suppl. 12. Schreb. 42. Willd. Sp. Pl. v. 1. 314. Juss. 34. Palissot de Beau. Agrost. 91. t. 18. f. 6. Lamarck Illustr. t. 37.—Class and order, *Triandria Monogynia*. Nat. Ord. *Gramina*.

Gen. Ch. *Cal.* Glume turbinate, of two equal valves, containing three or four florets; each valve wedge-shaped, unequally four-cleft, with a linear base; and bearing at its back, between the smaller segments, a straight upright awn, exceeding its own length. *Cor.* Glume of two unequal valves; the outer similar to the calyx, and in like manner awned; inner very short, undivided, ovate, flat, awnless. *Stam.* Filaments three, very short; anthers linear, the length of the glumes. *Pist.* Germen superior, linear; style simple, capillary; stigmas two, bearded laterally. *Peric.* none, except the permanent corolla, investing the seed, but not united with it. *Seed* solitary, oblong, pelucid, very smooth, flat at the inner side, convex at the outer.

Eff. Ch. Calyx turbinate, of two equal four-cleft valves, each awned at the back, containing three or four flowers. Corolla of two unequal valves; the outermost awned.

1. *P. Cornucopia*. Linn. Suppl. 105. Roxb. Coromand. v. 2. 17. t. 131.—Sent from India by Koenig to Linnæus. Roxburgh says it grows under bushes, in dry uncultivated ground, on the coast of Coromandel. This is a small creeping grass, a few inches high. *Leaves* in two ranks, compressed, smooth. *Flowers* spiked, each resembling a little shuttlecock. Dr. Roxburgh's figure does not exactly answer to the description, nor to the appearance of our specimens.—We have not been able critically to examine this grass, for want of sufficient plenty of specimens in different states.

POMMETTE'. See POMMÉ.

POMNA, in *Geography*, a river of Hindoostan, which runs into the Mahany; 10 miles N. of Bahar.

POMOERIUM, among the Romans. Authors are not agreed as to particular circumstances relating to the pomœrium; some will have it to be a piece of ground without the walls; others a space within them; and others again think it was both within and without. But whichever of these is true, the pomœrium was a place esteemed sacred, and kept free from houses and every other kind of obstruction. Hist. Acad. Inscr. vol. ii. p. 91, seq.

POMONA ISLAND, or *Mainland*, in *Geography*, the largest of the Orkney islands which belong to Scotland, is situated in the northern ocean, between the coast of Caithness, and Shetland. The etymology of its distinctive appellation is much disputed; but is most properly to be referred to two Icelandic words that signify *Great Land*, in allusion to its size compared with the neighbouring islands. According to Barry it extends from east to west, its longest direction, not less than thirty English miles, and varies in breadth from sixteen miles on the west side, to five or six on the east side; and near the middle it is so narrow as to form a neck of

land, which comprehends little more than a mile across, dividing the island into two peninsulas. This isthmus is bounded on one shore by the beautiful and spacious bay of Scalpa, and on the other by the bay of Kirkwall. It is both extremely level and damp, and in other respects so formed, as to induce a reasonable conjecture that it was once covered by the ocean, and that the present Mainland was formerly two distinct islands.

Pomona is divided into nine parishes, *viz.* Evie-and-Rendal, Birfa-and-Harra, Sandwick, Stromness, Frith-and-Stennis, Kirkwall-and-St. Ola, St. Andrew's-and-Deerness, Holm-and-Paplay, and Orphir. These display much variety of appearance, soil, culture, and elevation. Two ridges of hills intersect a great portion of this island, and throughout a considerable extent run parallel to each other. The one runs from south to north, and forms the western boundary of the Mainland; and the other, rising towards its eastern extremity, stretches westward towards the parish of Holm into that of Orphir, (whence the direction is suddenly changed towards the north at nearly a right angle,) and extends through the parishes of Frith and Rendal. In both these ridges the acclivities are usually green, and when cultivated are fertile and productive. The summits are covered with various kinds of grass intermixed with heath, which at once affords pasturage for sheep, black cattle, and horses, and furnish a secure haunt for multitudes of moor-game. In the parish of St. Ola, around Kirkwall, the soil is mostly good, but the greater portion of it being either common or vested in the community of the borough, lies in a waste uncultivated state. The parish of Deerness-and-St. Andrew, consisting of an extensive tract of level ground, is better cultivated; as are likewise the united parishes of Holm and Paplay, which indeed constitute one of the most compact districts in the country. The soil here is a mixture of clay and sandy loam, and having for the most part a southern exposure, raises good crops of oats and bear. Flax also is grown in considerable quantities, and is manufactured into linen during the winter season. The parish of Orphir, on the west side of the bay of Scalpa, possesses more fertility of soil in its central parts, than perhaps any other in Orkney, but its extremities are dreary, bleak, and barren. Mackerel and herrings frequently visit the coast here in vast shoals, but from want of skill, industry, or capital, few of them are caught. Howton, a small harbour in this parish, is much noted in the history of Orkney, as the scene of some remarkable transactions of old, when Orphir contained the palace and chief residence of earl Paul, and other ancient counts of Orkney.

To the north-west of Orphir lie the united parishes of Frith and Stennis, which are chiefly remarkable for several monuments of antiquity. In a level tract between two ridges is a vast collection of sepulchral *tumuli*, or barrows, which are conjectured to contain the ashes of warriors, who may have fallen in battle on this spot. Neither history nor tradition, however, afford any clue to such an event. Not far from hence, and close to the loch of Stennis, is a circle of large stones, some of which are about fourteen feet high, and four broad. Several of them have fallen down, of others fragments remain, and of some only the holes in which they stood. The whole is surrounded by a circular ditch, twenty feet broad and twelve deep, and inclosing an area sixty fathoms in diameter. Near this circle are several scattered stones, also four tumuli of considerable magnitude ranged in pairs, and opposing each other on the east and west sides of the monument. A semicircle of stones is situated on the opposite side of the loch. These are of larger dimensions than the stones of the circle, and are environed by

a vallum instead of a ditch, exterior to which are likewise several stones, apparently fixed without any regular order. These monuments are usually ascribed to the Celtic Druids, like those of Stonehenge and Avebury, but the fact that no Celtic colony ever visited Orkney, completely invalidates this hypothesis, and leaves their origin veiled in the most profound obscurity, unless we conjecture that they were courts of justice, or temples formed in honour of Odin, the Scandinavian god of battle.

Northward from Stennis are the united parishes of Evie-and-Rendal and Birfa-and-Harra. Evie and Rendal, are only partially cultivated, but feed a large number of cattle. Fish of various kinds, and particularly cod, ling, haddocks, and skate, abound on the shores of Evie, which are also distinguished by several of those ancient monuments called Picts'-houses, and by numbers of scattered tumuli. Harra and Birfa were in very remote ages covered with a forest, though at present not a patch of wood remains. The proof of this is that trunks of trees, and horns and bones of red and fallow deer, are dug up in various parts of this district. Several beautiful lakes are dispersed through these parishes. The soil in Birfa is much diversified; but in Harra a deep clay is chiefly prevalent, intermixed with some wet and swampy ground. Marle is here abundant, but seldom used for the purposes of manure. Notwithstanding this, however, superior crops of bear and oats, and also of flax and hemp, are raised in this parish. Birfa is noted for a magnificent palace, (now in ruins,) which was erected by some of the ancient earls of Orkney, and was for many years the principal residence, and probably also the seat of government. It stands on a projecting point of land close to the sea side, and immediately fronting what is denominated the burgh of Birfa. This last is a small portion of high land, (now broken off from the Mainland by the force of the ocean,) which bears all the marks of having been a rock fortification in very remote times. On this islet are the remains of a chapel dedicated to St. Peter, and till lately a celebrated place of pilgrimage. Picts'-houses are frequent in Birfa, as are likewise single monumental stones. Two of these, known by the name of Stanevaudy, stand on a mound or barrow; and three of a smaller size are surrounded by a great number of tumuli, concerning which even tradition is totally silent. Marble and alabaster are said to have been discovered in this parish, also at Buquoy and Swanay.

The other two parishes in Pomona are Stromness and Sandwick, which occupy a peninsula on the west side of the island, formed by the Atlantic and the lochs of Stennis. They contain about thirty-one square miles, of which about a ninth part only is cultivated, and the remainder devoted to pasturage. Mineral springs are found in various parts of these parishes; and mines of lead and iron were opened and wrought for some time near Stromness, which is now the most populous town in Orkney, and is a place of some trade. Kirkwall is the only borough in the Mainland; but though the seat of the courts of justice for Orkney, it is more than rivalled in extent and in commercial enterprise by Stromness. See KIRKWALL and STROMNESS; see also ORKNEY *Islands* for some account of the history of Pomona, manners and customs of the people, &c. &c. History of the Orkney Islands by the Rev. Dr. Barry, second edit. with corrections and additions, by the Rev. James Headrick, 4to., 1808.

POMONA, in *Mythology*, an amiable nymph, for whose favour the deities of the fields were competitors. The name was originally appropriated to some person who had merited divine honours by the culture of fruit-trees, and especially of apple-trees. This nymph is represented as sitting on a

large basket full of fruit, holding a number of apples in her left hand, and in the right a nosegay of flowers. At Rome she had a temple and altars. Her priest was called *flamen Pomonalis*, and sacrifices were offered to her for the preservation of the fruits of the earth.

POMOZDINSKOI, in *Geography*, a town of Russia, on the Vitchehda.

POMPADOUR, a town of France, in the department of the Correze; seven miles S.W. of Uzerches.

POMPEI, GIROLAMO, in *Biography*, an Italian poet and a man of letters, was born of a noble family at Verona in 1731. He became an early proficient in classical literature, and attained an excellent style. At this period the marquis Maffei and other eminent literary characters were resident at Verona, in whose society the talents of Pompei received the most advantageous cultivation. He was first known as an author by "Canzoni Pastorali," in two vols. 8vo. Able critics spoke in the highest terms of these pieces, on account of their sweetness and elegance: it was thought by some good judges that they were never surpassed by any productions of the kind. He next translated some of the Idylls of Theocritus and Moschus, in which he exhibited a very happy selection of Italian words, corresponding with the Greek. The next object of his attention was dramatic poetry, in the higher departments of which the Italians were at that time very deficient, and he published in 1768 and 1770, his tragedies of "Hypermetra" and "Callirhoe," which were represented with great success in several cities of the Venetian state. He now employed several years on a translation of "Plutarch's Lives," which appeared in 1774 in four vols. 4to. This work gave him considerable reputation as a prose writer and scholar, and it ranks among the very best classical versions in the Italian language. In 1778 he published two volumes of "Nuove Canzoni Pastorali:" he also published poetical versions of the "Hero and Leander of Musæus;" of the "Hymns of Callimachus;" "A hundred Greek Epigrams;" and the "Epistles of Ovid." He was a member of some of the academies, and he served his native city in the capacities of secretary to the tribunal of public safety, and to the academy of painting. He died at Verona in 1790, at the age of 59, and his memory was honoured by various public testimonies, and by the erection of his bust in one of the squares of the city. He was highly respected and esteemed, as well for his morals as for his literary talents, and his fame was not limited to the confines of Italy. An edition of his works was published after his death in six vols. 8vo. Gen. Biog.

POMPEIA, in *Ancient Geography*. See POMPEII.

POMPEIA Trophœa, the *Trophies of Pompey*, a name given by Strabo, to the place called by other authors "Summum Pyrenæum," because these trophies were placed on the summit of the Pyrenées. They were situated in the eastern part of the Pyrenées, at the passage called "Col de Pertuis," and were erected to commemorate his victory over Sertorius, and to serve as a boundary between Gaul and Spain.

POMPEIANO, in *Geography*, a town of Italy, in the department of the Mela; 11 miles S.W. of Brescia.

POMPEII, in *Ancient Geography*, an ancient city of Naples, overwhelmed in the first century by the same disastrous catastrophe which destroyed *Herculaneum*. (See that article and PORTICI.) It is said to owe its name to the triumphant pomp in which Hercules led his captives along the coast after his conquest of Spain: it was probably situated on an arm of the sea, and served as a port for the inland towns; which inlet of the sea has been filled up by successive eruptions, besides that which destroyed the town. It is about 14 miles from Naples on the road to Nocera. From

Naples to "Torre del Greco," the high way is almost a street, so close are the villas, villages, and towns to each other. As the road was along the coast, and at the foot of Vesuvius, every break gives on one side a view of the bay, on the other of the mountain. Torre del Greco still presents in its shattered houses, half-buried churches, and streets almost choaked up with lava, a melancholy instance of the ravages of the last eruption. The depth of the destructive torrent is in some places 25 feet, so that the entrance into several houses is in the second story, and into one church, through the great window over the western door. Some edifices were entirely destroyed: others were surrounded, incruited, and filled with lava, and may perhaps give a very accurate idea of the state of Herculaneum at the time of its destruction. The town of Torre del Greco was supposed by Cluverius to occupy the site of Herculaneum, because the distances nearly corresponded, and inscriptions have been found that seem to corroborate this conjecture. In fact, making allowances for the extent of the ancient town, there is little more than three-fourths of a mile difference, so that its name and jurisdiction extended probably much farther. In the vicinity of this place are the ruins of ancient barracks, which were the quarters of a legion of Roman soldiers, and behind the barracks are two theatres, one small, and supposed to have been covered, the other large: both these edifices were lined with marble, beautifully paved, and in every respect highly finished. These theatres are exactly of the same form as the Teatro Olimpico of Palladio at Verona; having like it a narrow proscenium, and three entrances, one large and the other two less, to the stage from the scenery behind. These theatres, when discovered, were nearly entire, but though they have been stripped of all their decorations, they still retain all their great characteristic features. Behind the little theatre is a temple of Isis, occupying an angle formed by two streets. Some have supposed that oracles were issued from this temple, and have declaimed against the priestcraft that was practised here; but it does not appear that oracles were ever given at Pompeii, as this was a privilege reserved to the ancient and more renowned temples; besides, oracles had every where ceased before this edifice or temple, if it may be so called, was erected; and moreover, the entrances into it are too public, and the whole contrivance too gross to dupe the dullest peasant, much less the polished inhabitants of Pompeii. In this building there are niches where various statues of Venus, Priapus, &c. were found, which with the furniture, marble, and pictures, were transported to Portici. Behind this temple, on one side, is a court surrounded with a portico, supported by sixteen Doric pillars, and from a sort of pulpit on one side it may be inferred, that it was intended for some public assembly. Another court follows with a similar portico, and communicates with the grand portico of the theatre, supported by more than sixty stone pillars of the Doric order, but in proportion bordering upon Tuscan. Near this portico lie several fragments of columns of a much larger size, and of bolder proportion; which perhaps belonged to the temple of Neptune, and may have been thrown down and laid in their present situation by the earthquake which nearly destroyed this city a few years previous to the eruption that buried it finally. The damage occasioned by the first disaster was never probably repaired, and seems to account for the apparent want of architectural magnificence in a city, equal perhaps in size and population to Herculaneum, and complimented by Seneca with the addition of "Celebrem Campaniæ urbem." The most perfect and most curious object that has yet been discovered is a villa at a little distance from the town. It consists of three courts; in the first and largest is a pond,

and in the centre an *ædicula* or little temple: there are numerous apartments of every description paved in Mosaic, coloured and adorned with various paintings on the walls, all in a very beautiful style. The baths in this villa seem to have been objects of particular attention. Cicero's Pompeianum stood in the neighbourhood of this town, and possibly on this very spot. It was a favourite retreat much frequented by Cicero and his friends. The houses at Pompeii are on a small scale, generally of one, sometimes of two stories: the principal apartments are always behind, inclosing a court with a portico round it, and a marble cistern in the middle; two had glass windows, in the others shutters only were used; the pavements are all Mosaic, and the walls are stained with mild colours; the decorations are basso-relievos in stucco and paintings in medallions. Marble seems to have been common. Upon the whole Pompeii bears a strong resemblance to modern Italian towns, with this difference, that in point of general appearance the latter have the advantage. It should however be remembered, that Pompeii had already been damaged by an earthquake, as we learn from Tacitus (Ann. xv. 22.) "Motu terræ celebre campaniæ oppidum Pompeii corruit:" that the roofs and upper parts of the houses have been borne down by the weight of ashes and pumice stones upon them; and that, as not more than a quarter of the town has been hitherto explored, buildings of greater magnificence may still remain buried.

It is generally supposed, that the destruction of this city was sudden and unexpected; and it is even recorded that the people were surpris'd and overwhelmed at once by the volcanic storm while in the theatre. (Dio, lxxvi.) But to this opinion there are several objections. The number of skeletons discovered in Pompeii does not amount to sixty; and ten times this number would be inconsiderable when compared with the extent and population of the city. It may perhaps be doubted, whether Pompeii was ever fully restored and re-peopled after the earthquake of 63; but it was certainly in part repaired and inhabited by a very considerable body of citizens. As for the circumstance of the inhabitants, of either Herculaneum or Pompeii, being surpris'd while in the theatre, it is so palpably absurd, that it is difficult to conceive how the historian above-mentioned could relate it with so much gravity. The first agitation and threatening aspect of the mountain, must have banished all mirth and amusement from its borders, and filled every heart with awful expectation and terror. Such were the previous intimations, that must have alarmed the inhabitants of their danger, that the greater number of them had time to escape from Pompeii, and those whose skeletons remain were either decrepid slaves, or criminals in a state of confinement.

The excavations among the ruins of Pompeii continue to be prosecuted with much industry. An extent of about 500 feet of the town wall has been completely cleared. It is from eighteen to twenty feet high, twelve thick, and fortified at short distances with square towers. In the main street, passing in front of the temple of Isis, has been discovered the portico of the theatre. Near the same spot, ten feet below the level of the street, was found a human skeleton, and immediately beneath it a large collection of gold and silver medals, in the finest preservation, chiefly of the reign of Domitian. Under a superb portico in the quarter of the tombs a number of skeletons has been discovered, and among them those of a female and several children. Three finger-rings and several ear-rings were found among the bones. Among the vases discovered, there were two which were full of water, with a small quantity of ashes at the bottom. In one the water was limpid and odourless: in the other it was of a brownish tinge, and had the taste of

lye. For further particulars, see Eustace's Classical Tour through Italy, vol. i.

POMPEION, Πομπειον, in *Antiquity*, a stately edifice at Athens, in which were kept the sacred utensils made use of at festivals, and all things necessary for the solemn processions prepared. It stood at the entrance of the old city, which looked towards Phalerum, and was adorned with many statues of the Athenian heroes.

The word pompeion is derived from πομπειον, *cum pompa incedo*, and was likewise used for any utensils employed on these occasions.

POMPEIOPOLIS, or POLI, in *Ancient Geography*, a town of Asia, in Cilicia, which belonged to the Rhodians, and was situated between the mouth of the river Cydnus and that of Ladmus. Ptolemy. According to Tacitus and Dion Cassius it was situated on the coast, and had borne the name of Soli.—Also, a town of Asia, in the interior of Paphlagonia.—Also, a town of Mysia, which suffered much from an earthquake under the empire of Justinian.

POMPELO, or POMPEIOLIS, a town of Hither Spain, belonging to the Vascones. See PAMPELUNA.

POMPEY the GREAT, in *Biography*, an illustrious Roman, born in the year 107 B.C., was the son of Cn. Pompeius Strabo, an able commander, but extremely unpopular, on account of his severity and avarice. The subject of this article was distinguished for a fine expression of countenance, and a dignified grace of manner, and at a very early period he displayed talents fitted as well for the forum as the camp. He first served under his father, who commanded an army in the neighbourhood of Rome, against Cinna in the Marian civil wars. On this occasion he narrowly escaped assassination from Terentius, a young patrician, who had been engaged by Cinna to kill both the father and son. Pompey, being informed of the fact, retired in the night from his tent, and secured his father's life, by setting a guard round the pretorium. Soon after a mutiny broke out in the camp, and the soldiers were determined to abandon their detested general. His son, at this time not arrived to years of manhood, by his entreaties reconciled them once more to their general. In a very short time Pompeius Strabo was killed by lightning, and the party of Marius and Cinna became predominant, and filled Rome with slaughter. Young Pompey joined the party of Sylla, and after a series of sanguinary contests the Marian party in Italy was completely crushed, and Sylla became absolute master of Rome. It was fortunate for the reputation of Pompey, that while Sylla was exercising his cruelties in the capital, Pompey was employed in reducing Sicily. He succeeded in bringing the island to submission. Carbo, a distinguished Marian, having fled to the island of Corsica with several of his party, Pompey sent a squadron to invest the place, to which Carbo surrendered, in the hope that Pompey would recollect and readily repay the kindness he had done him, in saving his estate from forfeiture. But gratitude is not often found in persons raised so high as Pompey, and in the present instance the conqueror, unmoved by any principles of sympathy, or by the recollection of the former dignity of his enemy, (who had been thrice a consul,) received him with great harshness, and ordered him to be led to execution. If Carbo deserved his hard fate by his cruelties, Pompey lost some credit by his unfeeling rigour; he contrived, however, to win the affections of the Sicilians by his clemency. The Marian party had now revived in considerable force in Africa, and Pompey was sent over to quell the insurgents. In forty days, and with a comparatively small force, he regained all the territories of Africa which had forsaken the interest of Sylla.

Sylla. This rapid success astonished the Romans; and Sylla, who admired and dreaded the rising power of Pompey, recalled him to Rome. Pompey immediately obeyed, and the dictator, by saluting him with the appellation of GREAT, shewed to the world what vast expectations might be looked for from the maturer age of his victorious lieutenant. A mere title did not, however, satisfy the ambition of Pompey, he demanded a triumph, and when Sylla refused to grant it, he emphatically exclaimed, "that more people were ready to fall down before the rising than the setting sun." Sylla, struck with the observation, and not chusing to hazard a contest, gave up his opposition. Pompey, therefore, though as yet only a Roman knight, and not of the age requisite for entering the senate, enjoyed triumphal honours, but it was at a period in which the ancient discipline of Rome had been subverted to party violence. He now appeared not as a dependant, but as a rival of the dictator. Sylla soon after resigned the dictatorship, and Pompey, in a consular election, mortified him by a proof that his own interest with the people was superior to that of the late master of the commonwealth. Sylla repented the insult, by omitting his name alone among all his friends, as a legatee in his will; but Pompey had sufficient greatness of mind to overlook the slight, and to exert all his influence in obtaining a splendid public funeral for his remains. After the death of Sylla, Pompey supported himself against the remains of the Marian faction, which were headed by Lepidus. He defeated them, put an end to the war which the revolt of Sertorius in Spain had occasioned, and obtained a second triumph, though still a private citizen. He was soon after made consul, and in the exercise of that office, he restored the tribunitial power to its original dignity, and in forty days removed the pirates from the Mediterranean, where they had reigned for many years, and, by their continual plunder and audacity, almost destroyed the whole naval power of Rome. Pompey was now called to greater undertakings, and by the influence of his friends at Rome, and of the tribune Manilius, he was empowered to finish the war against two of the most powerful monarchs of Asia, *viz.* Mithridates, king of Pontus, and Tigranes, king of Armenia. His operations against the king of Pontus were bold and vigorous, and in a general engagement the Romans so completely vanquished the enemy, that the Asiatic monarch escaped with difficulty from the field of battle. After Pompey had settled the affairs of Asia, he made a progress through Greece, where he heard the recitations of the poets and rhetoricians, and shewed his respect to philosophy by a munificent present to the city of Athens. His victorious return to Italy excited great apprehensions in many, who feared a renewal of the scenes acted by Marius and Sylla, but he was aware of their anxiety, and quieted their minds by disbanding his army the instant of his landing at Brundisium, and proceeding with the train of a private person to Rome. He was now met by the whole body of citizens, who welcomed him with loud acclamations. His demand of a triumph was granted without hesitation, and Rome had never before witnessed so splendid a spectacle as his triumphal procession for two days afforded. Many captive kings, and persons of high rank, walked before his chariot; and the spoils of Asia, delivered to the public treasury, amounted to an immense sum. He displayed his humanity by liberating all his captives after the triumph, and sending them back to their own country, with the exception of Aristobulus and Tigranes. It was now his plan, under the appearance of a retired private citizen, to maintain the first place in the state, by means of his reputation and influence; but in this

design he found a strong opposition from various quarters. Crassus and Lucullus surpassed him in wealth; the zealous republicans regarded him with suspicion, and Cæsar was laying the foundation of his future greatness. Pompey was therefore obliged to descend to party manœuvres, and he gained over to his interest the infamous Clodius. Cæsar, now returning from his government in Spain, planned a reconciliation between Crassus and Pompey, and, at the same time, associating himself with them, he formed the first triumvirate. The object that Cæsar had in view was the consular dignity, which he obtained in the year B. C. 59, and by the marriage of Pompey to his daughter Julia, an apparently firm union was cemented between them.

"It is," says the biographer of Pompey, "painful to follow the steps of this great leader after he was converted into a party-chief, aiding measures which, as a good citizen, he could not approve, and acting a subaltern part in oppressing the liberty of his country, when he might have taken the first station as its defender. His ingratitude to his great encomiast Cicero, whom he suffered to be driven into exile by the fury of the tribune Clodius, stamps an indelible stain on his character, although a subsequent quarrel with Clodius induced him to be a promoter of Cicero's recall." He gave Cæsar all his interest in procuring the illegal appointment to the command in Gaul for five successive years, a subserviency which, in the end, proved fatal to himself. For the maintenance of their power, Crassus and Pompey stood candidates for the consulship a second time, which they obtained, but not without some acts of violence. At the expiration of the year, Crassus departed for his extensive government in the east, while Pompey, who had been nominated to the government of Spain, remained at Rome, endeavouring to ingratiate himself with the people, by opening the new theatre which he had built, and exhibiting games with unusual splendour. He did not, however, trust wholly to popular favour, but kept Rome in awe by an army levied on his own authority, and stationed at its gates. By the slaughter of Crassus, and the death of Julia in child-bed, only two chiefs were left to dispute the empire of the world, circumstances which soon dissolved their bond of union, and rendered them competitors rather than colleagues. Pompey, however, still retained a friendship for Cæsar, and gave him all the assistance he could, to supply the losses of his campaigns. The disturbances in the capital increasing, a party was desirous of nominating Pompey dictator; but Cato proposed, as a less obnoxious measure, that he should be elected sole consul, which unprecedented circumstance took place in the year 52 B. C. He now began to be fully sensible of the danger of Cæsar's superiority, and in order to improve his interest with the great families, he married Cornelia, widow of the younger Crassus, and daughter of Metellus Scipio, and he appointed her father his partner in the consulate. Pompey, by his influence, caused Cæsar's application for the prolongation of his command in Gaul to be rejected by the senate, and he filled the principal magistracies with the open enemies of that general. He also recalled the legions which he had lent Cæsar, and which were restored without any hesitation. Proposals were now made that they should both resign their commands, but Pompey's partisans remonstrated, that the legal term of Cæsar's was already expired, which was not the case with his. It was no longer attempted to be concealed, that they were both apprehensive of each other, and that neither was willing to sink into the condition of a private citizen. In the estimate of the comparative justice of the pretensions of each, Lucan, though by principle a Pompeian, has said, that Pompey could not bear an equal,

nor Cæsar a superior, (the former, indeed, had been accustomed to be the first man in Rome,) readily to admit the idea of a younger competitor. He had, however, the form of the constitution on his side; for the senate, while it superseded Cæsar in his province, allowed Pompey to retain his command. In real power the two rivals were very unequal. Pompey was never, in talents, a match for Cæsar, and now habituated to the indulgencies of a civic life, was become "magni nominis umbra," the mere shadow of a great name. Still he does not appear to have been sensible of any decline of his authority; and when Cicero, finding him deaf to proposals of accommodation, and nevertheless negligent in his preparations, asked him with what forces he intended to oppose Cæsar, he vauntingly replied, "When I stamp with my foot, an army will start out of the ground." Cæsar in the year 49 B.C. crossed the Alps, and encamped at Ravenna. A decree of the senate proclaimed him a public enemy, and Pompey was required to take upon himself the defence of the state. He began to prepare in earnest for war, but was behind hand with his rival. Cæsar passed the Rubicon, and advanced to Rome, and Pompey, finding himself unequal to oppose the force of his rival, fled. The result, however, was the famous battle of Pharsalia, which took place in the year 48 B.C. Pompey, who was compelled to engage, contrary to his judgment and inclination, did little worthy of his former fame, and as soon as he saw his army thrown into disorder, losing all that presence of mind for which he was formerly remarkable, he withdrew to his tent. There he remained silent, like one overpowered by calamity, till the approach of the victor's army urged him to a hasty flight; he proceeded to the sea-coast and embarked for Lesbos. In that island he had a most affecting interview with his faithful Cornelia, with whom, and a few friends, he sailed away to the coast of Asia. Touching at Cyprus, a consultation was entered upon respecting further proceedings, and it was resolved to withdraw to Egypt, where it was expected a friendly reception would be given them by Ptolemy, on account of the favours done to his father by Pompey. When, however, the approach of this Roman was made known to the Egyptian court, a council was held respecting the conduct proper to be observed on so important and delicate an occasion. It was at length resolved, as the safest course, that he should be enticed into their power, and then murdered. A barge was sent to bring him ashore; some appearances led him to suspect treachery, but it was too late to hesitate. Taking leave of his wife and son, he stepped into the barge, repeating a couplet of Sophocles, which says, that he who puts himself in a tyrant's power has lost his freedom. As soon as the boat touched the land a crowd ran to meet it; and as Pompey was rising to go on shore, one of the Romans stabbed him in the back, and a number of assassins joined in the bloody deed. He received their strokes without a groan or struggle. They cut off his head, and left his naked body exposed on the shore. His faithful freedman remained by it, till night coming on he was left alone, he then got together some planks from a wreck, and made a funeral pile. An old Roman soldier, who had served under Pompey in his youth, assisted him in performing the funeral rites. When Cæsar arrived in Egypt, the head of his rival was presented to him, but he turned away from the spectacle and burst into tears. To shew his detestation of the death, he put to death all those who had any hand in it, and causing the head to be interred with great solemnity, he erected over it a temple to Nemesis. Pompey perished in the fifty-ninth year of his age, leaving behind him a name among the most illustrious of antiquity. He left two sons, Cneius and Sextus, of

whom the first lost his life soon after the battle of Munda; the second, after having rendered himself formidable by sea to the triumvirs, was reduced to take refuge in Armenia, where he was killed. We shall close this article with the character of Pompey drawn by an able hand. "His private virtues were many; he was moderate in his pleasures, temperate and free from dissolute or ostentatious luxury in the highest fortune, kind-hearted, mild, and humane, when uninfluenced by party violence. His talents were great and various, if not of the highest class; and his mind was cultured by letters and philosophy. As a citizen he cannot rank among pure patriots, yet his ambition tended only to be the chief of a free state, not to be the subverter of its freedom. He wished to be, says Lucan, ruler of the senate, but of a senate of authority. He preferred arms to the toga, but in arms he was a lover of peace. In his ambitious pursuits he was occasionally guilty of violence and ingratitude; but this was a consequence of his commencing life under the auspices of party, from which baneful influence he never was freed. He finally rose to a station to which he was unequal, and forfeited in the last act of the eventful drama of his life, much of the reputation he had gained in the preceding acts." Plutarch. Univer. Hist.

POMPEY'S Pillar. See PILLAR.

POMPEY, in *Geography*, a post-town of America, in Onondago county, New York, incorporated in 1794, and containing 2332 inhabitants.

POMPHOLYX, in *Medicine*, a disease which is characterised by an eruption of *bullæ*, blebs, or large vesications on the skin, unaccompanied by fever, and without any inflammation surrounding them.

This is the sense in which Dr. Willan appropriated the appellation of *Pompholyx*, in his treatise on cutaneous diseases, with the view of avoiding the confusion of authors, who have classed, under the title of *Pemphigus*, all affections accompanied by *bullæ*, whether febrile or non-febrile, and have even included, under the same head, a supposed idiopathic and contagious disease. See PEMPHIGUS.

Foësius observes, in his glossary of the words used by Hippocrates, that the father of physic employed the word *πομφοι* to denote wheals, or those eminences which resemble the eruption produced by nettles; but that Galen explains the *pomphi*, as elevations of the cuticle, containing a fluid. The word *πομφολυξ*, however, signified a bubble of air, appearing upon the surface of water, to which these *bullæ* upon the skin bear a considerable resemblance.

Dr. Willan described three species of pompholyx, to which he gave the epithets *benignus*, *diutinus*, and *solitarius*. The *first* of these is characterised by the appearance of transparent *bullæ*, of the size of a pea, or sometimes as large as a hazel nut, which arise successively, and in three or four days break, discharge their contained lymph, and soon heal. They are seated chiefly in the face, neck, and extremities; and occur most commonly in boys in hot weather, in infants during the irritation of teething, and in young persons of irritable habit from eating acrid vegetable substances, or from swallowing a few grains of mercury. The *second*, Pompholyx diutinus, is a tedious and painful disorder, and is usually preceded for some weeks by languor and lassitude, head-ache, sickness, and pains in the limbs. At first numerous red pimply elevations on the cuticle appear, with a sensation of tingling, which are presently raised into transparent vesications, that become as large as a pea within twenty-four hours, and, if not broken, afterwards attain the size of a walnut. If they are rubbed off prematurely, the excoriated surface is sore and inflamed, and does not readily heal. The *bullæ* continue to rise in succession on different

different parts of the body, and even re-appear on the parts first affected, in some cases for several weeks, so that the whole number of bullæ is very great; and when the excoriations are thus multiplied, a slight febrile paroxysm occurs every night, and the patient suffers much from the irritation, and from want of sleep. Occasionally, indeed, the irritation is so severe, a certain degree of inflammation surrounding the diseased parts, that a constant febrile excitement is kept up, especially in elderly people.

The Pompholyx diutinus chiefly affects persons of debilitated constitution, and is commonly most severe in persons advanced in years. It is not always easy to trace the exciting causes of the disease; it seems to originate, indeed, under different conditions of the body, but often after the exhaustion of long fatigue and continued anxiety, with an imperfect nutriment; sometimes it appears to be brought on by intemperance; and not unfrequently it is connected with anasarca, or general dropsy, with scurvy, hæmorrhæa petechialis, and other states of the constitution, in which the powers of the cutaneous circulation are feeble. In some instances it has appeared under circumstances to which many forms of cutaneous eruption are ascribed, namely, after profuse sweating, during which cold liquors were copiously swallowed, and a sudden chilliness produced. In the fevers in which it has been observed to occur, the eruption has been obviously symptomatic, and not a characteristic of a peculiar febrile disease, like the idiopathic eruptive fevers, small-pox, measles, &c., with which it has been erroneously assimilated, under the appellation of Pemphigus; for it has not only occurred at various periods of the febrile attacks, and varied much in its duration; but it has accompanied fevers of every type, continued, remittent, and intermittent, and has even appeared among the symptoms of arthritic, catarrhal, and other secondary fevers.

If we refer to the descriptions, and to the details of individual cases, given under the appellation of Pemphigus by many writers, we shall find the preceding statement fully confirmed. It will also appear from the same authorities, that the pompholyx is never communicated by contagion, like the idiopathic exanthemata before alluded to; and that the fluid contained in the bullæ is, in fact, not ichorous, but a bland lymph, resembling that which is poured into the ventricles of the brain in hydrocephalus. This circumstance was demonstrated by one gentleman, not only by chemical analysis, but by the inoculation of his own person with the lymph, which produced no effect whatever. (See Mr. Gaitskell's case of Pemphigus, in the Memoirs of the Medical Society of London, vol. iv. art. 1.) There is another difference, too, between pompholyx and the idiopathic eruptive fevers; which is, that in several of the persons, whose cases are recorded, the disease occurred more than once.

There is some difference both in the appearance and in the method of cure of this form of pompholyx, as it affects the young and the old. It is always most troublesome and obstinate in aged people, in whom the transparent bullæ sometimes equal the size of a turkey's egg, while others of a smaller size are intermixed with them, which appear dark and livid. When broken, they leave a black excoriated surface, which sometimes ulcerates. In these cases the warm bath used every second day, was considered by Dr. Willan as the most active palliative of the symptoms, and as proving ultimately the most effectual remedy. Cases sometimes occur, however, even in people far advanced in age, in which there is a febrile disposition connected with the irritation of the eruption, which interdicts the use of the warm bath; in an old lady of eighty, in whom the bullæ were sur-

rounded by an exanthematous redness, the warm bath produced so violent an exacerbation of the fever, as to render its repetition no longer adviseable. Dr. Bateman observes, that the decoction of cinchona, with cordials and diuretics, has appeared to him to be of considerable advantage, in the pompholyx of old people, especially when the eruption was combined with anasarca, which is not uncommon in these debilitated habits. In young persons, the warm bath appears to be decidedly injurious, inasmuch as it seems to increase both the unpleasant tingling in the skin, and the number of the vesications. In such patients, indeed, the disease is seldom severe, and generally disappears in two or three weeks, especially under the use of cinchona with the mineral acids.

The *third* species, called Pompholyx solitarius by Dr. Willan, is so rare a form of the disease, that that experienced practitioner had only seen three cases of it in the course of his practice, and these occurred only in women. One large vesication arises usually in the night, after a sensation of tingling and prickling in the skin, and rapidly distends itself, so as to contain sometimes a tea-cup full of lymph; within forty-eight hours it breaks, discharging its fluid, and leaving a superficial ulceration. Near this another vesication appears in a day or two, and goes through the same course; and it is sometimes followed in like manner by two or three others in succession; so that the whole duration shall be eight or ten days. It is not easy to lay down any very decided plan of treatment for a disease which has been so little noticed; but Dr. Willan believed that cinchona internally, and linseed poultices externally, followed by light dressings to the sores, were employed with benefit in the cases which he treated. See Willan on Cutaneous Diseases, class iv. Bateman's Practical Synopsis of Cutan. Diseases, p. 138. See also the individual cases by Mr. Gaitskell, before quoted; by Mr. Upton in the Mem. of the Medical Society of London, vol. iii. appendix; by Mr. Christie, in the Lond. Med. Journal, vol. x. p. 385; by Dr. Stewart in the Edinburgh Med. Commentaries, vol. vi. art. 3; by Dr. Hall, in the Annals of Medicine, vol. iii. art. 9; by Mr. Ring, in the Lond. Med. Journ. vol. xi. p. 235; by Dr. Dickson, in the Trans. of the Royal Irish Academy for 1787; and by Bang, in the Acta Reg. Soc. Med. Hauniensis, vol. i. p. 8, &c.

POMPHOLYX, Πομφολυξ, literally denoting a *bubble arising on water*, in *Pharmacy*, a name anciently given to a sort of metalline flower; being a white, light, and friable substance, found adhering to the lid or cover of the crucibles or furnaces, in which zinc or its ore is melted with other metals.

It is esteemed detergent and desiccative, though only applied externally.

The early chemists called it *nil*, or *nihil album*, *luna philosophica*, *flores zinci*, and also *zincum calcinatum*, and it has been denominated sometimes *white tutty*, in regard of its resemblance to tutty in virtue. (See TUTTY.) In the modern London Pharmacopeia it is called *Oxide of ZINC*; which see.

POMPIDOUR, in *Geography*, a town of France, in the department of the Lozere; nine miles S. of Florac.

POMPIGNAC, a town of France, in the department of the Gironde; six miles E. of Bourdeaux.

POMPIGNAN, JEAN-JACQUES LE FRANC, *Marquis de*, in *Biography*, a man of letters, was born at Montauban in the year 1709. He was brought up to the law, and became advocate-general, and afterwards first president of the court of Aides at Montauban. At a very early period he displayed a talent for poetry, and in 1734 brought upon the stage his tragedy of Didon, in which he attempted an imitation of Racine. Being well acquainted with the learned

learned languages and modern ones, he continued to employ himself in original composition and translation, and in a residence at Paris formed extensive connections in the literary circles. In 1760 he was admitted into the French academy. At this time the Encyclopædists and their associates were become a numerous and powerful party, and they did not scruple to attack, without disguise, opinions that had been sanctioned by time and the prejudices of the world. Pompignan was avowedly enlisted in the opposite party; and in an academical harangue, which he was called on to make, he attacked with vigour and some degree of violence the principles which then assumed the name of philosophy. This decided hostility to the literati of the day, who had possession of the public mind, drew upon him a large portion of satire from Voltaire and others, in which not only his literary talents were ridiculed, but the imputation of hypocrisy, and the interested pursuit of court favour, were attempted to be fastened upon him. His contemporaries, however, who were not biassed with party prejudices, admit that he was a good writer, and that the whole tenor of his life gave abundant evidence of real and sincere piety. He retired from the contentions of the metropolis to his estate of Pompignan, where he died in 1784, esteemed by the public and regretted by his tenants, to whom he was a father and protector. His works were published collectively in six vols. 8vo. They consist of dramatic pieces, discourses, harangues, an imitation of Virgil's *Georgics*, and translations from *Æschylus* and *Lucian*. His style is pure and elegant, his sentiments are laudable, and his remarks judicious.

POMPIGNAN, JOHN-GEORGE LE FRANC DE, brother of the preceding, a prelate of high rank and distinguished merit, was born at Montauban in the year 1715. He was educated for the clerical profession, and was ordained priest at a proper age, and in 1744 he was presented to the valuable bishopric of Puy, in Languedoc. On the accession of Lewis XVI. he was translated to the archiepiscopal see of Vienne, in Dauphinè. In both these sees he discharged the duties of his episcopal functions with the greatest assiduity, and displayed unwearied zeal in his personal labours, as well as the productions of his pen. In 1789, he was one of the clerical deputies sent by the province of Dauphinè to the meeting of the states-general; and when it was deliberated in the chamber of the clergy, in what manner they should verify their powers, he was one of the members of that order, who voted that such verification should take place in the general assembly of the three orders. This point having been carried, the archbishop went at the head of the majority, and formed a junction with the deputies of the Commons. Soon afterwards he was a member of the royal council, and became minister of the department which had the superintendency of ecclesiastical benefices. At this period the pope addressed to him a letter, strongly conjuring him to resist, with all his influence and power, any encroachments on the rights of the church, and all innovations in the condition and appointments of the clergy. The stream was, however, too strong to be resisted by his efforts, and he sunk, probably through grief and disappointment, into the arms of death. He was a considerable author; his principal works are, "A Critical Essay on the present State of the Republic of Letters," 1743; "Pastoral Instructions of the Bishop of Puy, for the Benefit of the new Converts within his Diocese;" "Devotion not at enmity with Wit and Genius;" "Mandates prohibiting the Reading of the Works of Rousseau and the Abbe Raynal." His talents as a writer and preacher have been variously estimated: some have com-

pared him with Bossuet, to which he had no well-founded pretensions, nevertheless he always wrote with purity, and often with elegance. To an enlightened genius he united a candid liberal mind; and though he was zealous for the interests of religion, and spent his life in combating the new philosophy, he was not a bigot nor intolerant. "No minister," says his biographer, "was more exemplary and irreproachable in his manners, nor more exempt from worldly mindedness. No one was more devoted to the duties of his station, possessed more knowledge, or greater simplicity, or was better entitled to the veneration in which he was held by the Catholic clergy."

POMPILUS, in *Ichthyology*, the name of a sea-fish, in the Linnæan system a species of the coryphæna, remarkable for following the rudders of ships to vast distances. It has no scales; it has a very broad line from the gills to the tail, under which are a number of dotted transverse lines, reaching to the belly, above the line on the side; the back is spotted with different colours; the mouth is moderately large, but the teeth very small; its forehead, between the eyes, is of a gold colour, and it has four fins, two at the gills, and two on the belly; and beside these, one long one running all the length of the back, and another answering it from the anus to the tail; its tail is not forked.

POMPILUS is also used by some authors for the nautilus, as well of the papyraceous as the camerated kind.

POMPION, in *Botany*. See CUCURBITA.

POMPON, *Great and Little*, in *Geography*, two rivers of Hindoostan, which run into the Ganges; the former three miles below Putna, and the latter near Futwa.

POMPONA, a name given by the Spaniards in America to a sort of vanilla, the pods of which are shorter and thicker than those of the common kind, and of a stronger smell, though less agreeable. The pulpy matter also in these pods is more liquid than that in the common kind, and the seeds much larger, being as big as those of mustard. This is never brought to market alone; but the Indians who gather it, cunningly mix it among the right kind; but this should be taken care of by the buyer, since this kind is very prejudicial, occasioning violent head-aches in men, and in women vapours and disorders of the womb.

It is not yet certainly known whether this be the fruit of a different species of the vanilla plant, or whether it be only different from the common in age, or in the place of growth of the plant.

POMPONAZZI, PETER, in *Biography*, a celebrated Italian Peripatetic philosopher in the 15th and early part of the 16th century, was born at Mantua in the year 1462. He pursued his studies at the university of Padua, where he became a professor, and greatly distinguished himself. During the war in which the republic of Venice was engaged against the league of Cambray, the university being for a time dispersed, he retired to Bologna, where he occupied the philosophical chair till his death, which happened in 1625, when he was in the sixty-third year of his age. His remains were afterwards conveyed to Mantua, where they were interred, by the direction of cardinal Hercules Gonzaga, in a magnificent tomb, on which a statue in bronze was erected to his memory. He was addicted to superstition and fanaticism, and a zealous advocate for judicial astrology, as appears from his book "De Naturalium Effectuum admirandorum Causis, seu de Incantationibus." He had, however, an understanding capable of penetrating into the depths of the Peripatetic system, and his writings, though barbarous and inelegant in style, discover great acuteness and subtlety of thought. He, like many persons of considerable talents in the present day, publicly taught that

that the natural reasons asserted for the doctrine of the immortality of the soul, are not solid and satisfactory; that Aristotle did not believe it; and that the whole proof of a future existence depends upon revelation, on which ground he was firmly convinced of its truth. On this subject he published a treatise "De Immortalitate Animæ," and the doctrine became so popular, that pope Leo X. thought it necessary to issue a bull to suppress it; and the monks were so clamorous in denouncing it as an impious production, that the book was condemned to be publicly burnt at Venice, and it was with some difficulty that the author himself escaped the flames. He owed his life to the powerful influence of cardinal Bembo. Pomponazzi was author of some other works, particularly "De Fato, libero Arbitrio, Prædestinatione, et Providentia," and "De Incantationibus," which were not published till after his death. Moreri. Bayle.

POMPONESCO, in *Geography*, a town of Italy, on the Po; five miles S.E. of Sabionetta.

POMPONIO-LETO, GIULIO, in *Biography*, one of the Italian literati of the 15th century, was born about the year 1428, at Amendola, in Upper Calabria. He was the illegitimate son of a noble of very high rank, and his baptismal name has not been ascertained; but he assumed that of Pomponius from the love of antiquity, subjoining that of LÆTUS, which he sometimes changed into INFORTUNATUS. He was rather whimsical in his names, and occasionally called himself Julius Pomponius Sabinus. He went to Rome at an early age, where he was initiated into classical literature, and in 1457 he succeeded one of his masters, viz. Lorenzo Valla, in his school. At this period, the noble remains of antiquity in that city, and the memory of its past grandeur, so inflamed his imagination, that the study of its topography and relics became his ruling passion. There was not a corner in Rome, which possessed any vestiges of ancient times, with which he was not well acquainted. He was frequently seen wandering pensive and alone among these scenes; and so great was his enthusiasm, that when any object, that he had not contemplated before, struck his eye, he would stand in a kind of extacy, and weep with tenderness; and it is said, his fixed attitude, with his wild looks, and mean apparel, made him almost pass for a spectre haunting the ruined walls and caverns. Pomponio founded an academy in Rome devoted to classical literature and antiquarian researches. Each of the members assumed a Roman or Grecian name, and at their meetings they discussed questions of history and antiquity, and sometimes of philosophy. The freedom which they took in their conversations, was the cause of a terrible storm, that fell upon them in 1468, during the pontificate of Paul II. To a charge of impiety and heresy, was added that of a conspiracy against the pope, who caused all of them, who were within his reach, to be apprehended and put to the torture to force a confession. Leto, who was at that time in Venice, was brought in chains to Rome, and subjected to a rigorous examination. He was probably completely cleared from the suspicion of all guilt, as he was allowed again to open his school in Rome, which he continued for twenty-eight years longer. Such was his assiduity in his occupation, that he was accustomed every morning, at break of day, to go to his school, and there explain the Roman authors to a crowd of auditors, many of whom, on account of the smallness of the room, were obliged to stand in the street; so great was the ardour for literature in those days. He had furnished his house with marbles and other monuments of antiquity, some of which had

been presented to him by Lorenzo de Medici. He died in 1498, at the age of seventy. He was author of various works, principally relative to Roman history and antiquities. Of these the following are the principal, "A Compendium of the History of the Roman Empire from the Death of Gordian the Younger to the Exile of Justin III.;" "Treatises on the Magistracies, Priesthoods, and Laws of Rome;" "De Antiquitatibus Urbis Romæ;" and commentaries on various Latin authors. He made great collections of ancient inscriptions, but is charged with having offered some fictitious ones to the learned world. He was probably imposed upon himself, and therefore the imposition upon others was innocent.

POMPTINE MARSHES, *Pomptine Paludes*, in *Ancient Geography*, denote a district in the S.E. part of the Campagna di Roma, and derive their appellation from "Pometium," a considerable town of the Volsci. Although this city was so opulent as to enable Tarquin to build the Capitol with its plunder, yet it had totally disappeared before the time of Pliny. Homer, and after him Virgil, represent the abode of Circe as an island, and Pliny, alluding to Homer, quotes this opinion, and confirms it by the testimony of Theophrastus, who, in the year of Rome 440, gives this island a circumference of 80 stadia, or about 10 miles. It is not improbable that this vast plain, even now so little raised above the level of the sea, may, like the territory of Ravenna on the eastern coast, have once been covered by the waves. Whatever may have been its state in fabulous times, the same Pliny relates, on the authority of a more ancient Latin writer, that at an early period of the Roman republic, the tract of country afterwards included in the marshes contained 33 cities, all of which gradually disappeared before the ravages of war, or the still more destructive influence of the increasing fens. These fens are occasioned by the quantity of water carried into the plain by numberless streams that rise at the foot of the neighbouring mountains, and for want of sufficient declivity creep sluggishly over the level space, and sometimes stagnate in pools, or lose themselves in the sands. The principal of these streams are the Astura, the Nymfa, the Teppia, the Aqua Pazza, in the upper, and the Amasenus and Ufens in the lower marshes. The pools or lakes line the coast, and extend from the neighbourhood of the mouth of the Astura to the promontory of Circe. The flat and swampy tract spread from these lakes to the foot of the Volscian mountains, and covered an extent of eight miles in breadth and 30 in length, with mud and infection. The loss of so much fertile and valuable land, and the exhalations arising from such a vast tract of swamp, carried not unfrequently to the Capitol itself by the southerly winds, must have attracted the attention of a people, as active and industrious as the ancient Romans. Appius Claudius, about 300 years B.C., when employed in carrying his celebrated road across these marshes, made the first attempt to drain them; and his example was, at long intervals, followed by various consuls, emperors, and kings, down to the Gothic Theodosius inclusively. The wars that followed the death of this prince, the devastation of Italy, and the weak and unsettled state of the Roman government, withdrew the attention from cultivation, and left the waters of the "Paludes" to their actual operation. The popes, however, when their sovereignty was established, and their attention no longer distracted by the piratical visits of distant, or the inroads of neighbouring barbarians, turned their thoughts to the amelioration of the inundated territory; and we find, accordingly, that from Boniface VIII. down to the late pontiff Pius VI. no

fewer than 15 popes have attempted this grand undertaking. Most of these efforts were attended with partial, none with full success.

Of the methods employed by Appius, and afterwards by the consul Cethegus, we know little, though not the road only, but the traces of certain channels dug to draw the water from it, and mounds raised to protect it from sudden swells of water, are traditionally ascribed to the former. Julius Cæsar is said to have revolved in his mighty mind a design worthy of himself, of turning the course of the Tiber from Ostia, and carrying it through the Pomptine territory and marshes to the sea at Terracina. This grand project, which existed only in the mind of the Dictator, perished with him, and gave way to the more moderate but more practicable plan of Augustus, who endeavoured to carry off the superfluous waters by opening a canal all along the Via Appia from Forum Appii to the grove of Feronia. It was customary to embark on this canal at night time, as Strabo relates, and Horace practised, because the vapours that arise from these swamps are less noxious during the coolness of the night, than in the heat of the day. Many of the inconveniences of the marshes still continued to be felt, as appears from Horace's complaints, and the epithet applied by Lucan to the Via Appia :

“ Et qua Pomptinas via dividit *Udu* paludes.” L. iii.

However, the canal opened by Augustus still remains, and is called the “ Cavata.” The luxury and improvident policy of the immediate successors of Augustus, and the civil wars that raged under Galba, Otho, Vitellius, and Vespasian, diverted their attention from works of peace and improvement; so that the marshes had again increased, and the waters swelled, so as to render the Via Appia nearly impassable. (See Sil. Ital. lib. viii.) At length Nerva resumed the task, and his glorious successor, Trajan, carried it on during ten years, and with so much activity, that the whole extent of country from Treponti to Terracina was drained, and the Via Appia completely restored in the third consulate of that emperor. This event is commemorated in three inscriptions, one of which may be seen on a marble slab at the village of Treponti: another more explicit was found near the 42d mile-stone on the Via Appia, and the third exists on a stone in one of the angles of the wall of the cathedral at Terracina. During the convulsions of the following centuries the marshes were again overflowed, and again drained by Cecilius Decius, in the reign of Theodoric. The commencement of this work is announced in an epistle drawn up in the declamatory style of the times, and addressed by the Gothic prince to the senate. Its success is acknowledged in another to Decius, containing a grant of the lands drained by him free from taxes for ever.

Of the different popes who have revived this useful enterprise, Boniface II., Martin V., and Sixtus Quintus, carried it on with a vigour adequate to its importance, and a magnificence worthy of the ancient Romans. But the short reigns of these benevolent and enterprising sovereigns did not permit them to accomplish their grand designs; and their successors of less genius or less activity contented themselves with issuing briefs, and imposing obligations on the communities and proprietors to support and repair the drains. The glory of finally terminating this grand undertaking, so often attempted and so often frustrated, was reserved for the late Pontiff, Pius VI., who, immediately on his elevation to the papal throne, turned his attention to the Pomptine marshes. The level was taken with precision, the depth of the different canals and outlets founded, the degree of decli-

vity in the beds of the rivers ascertained, and at length the work began in the year 1778. It was carried on, with incredible ardour and vast expence, for the space of ten years, and at length crowned with complete success, and closed in the year 1788. The draining of the Pomptine marshes is one of the most useful, as well as most difficult works ever executed, and reflects more lustre on the reign of Pius VI. than the dome of the Vatican, all-glorious as it is, can confer on the memory of Sixtus Quintus. In order to secure the permanent benefit of this great work, it is necessary that the canals of communication should be kept open, and the beds of the streams cleared. It is reported, however, that since the last French invasion, these necessary precautions have been neglected, and that the waters begin to stagnate again.

Mr. Eustace informs us, that when he and his companions crossed the Pomptine marshes, fine crops of corn covered the country on their left, and seemed to wave to the very foot of the mountains; while on the right numerous herds of cattle and horses grazed in extensive and luxuriant pastures. In their worst state, these marshes, on the side towards the sea, are covered with extensive forests, that inclose and shade the lakes which border the coasts. These forests extend, with little interruption, from Ostia to the promontory of Circe, and consist of oak, ilex, bay, and numberless flowering shrubs. Eustace's Classical Tour through Italy, vol. i.

POMPTON, in *Geography*, a town of America, in Bergen county, New Jersey, situated on Ringwood, a branch of the Passaic river, about 23 miles N.W. of the city of New York; containing 2060 inhabitants.

POMPUS, a town of Peru, in the diocese of Lima; 90 miles N.E. of Lima.

POMUM, in *Gardening*, a term applied to those sorts of plants and trees which bear fruit of the apple kinds, or which is of a fleshy nature. See PYRUS.

POMUM, in *Botany and Vegetable Physiology*, an Apple, is a peculiar kind of fruit, consisting of a fleshy coat, like the DRUPA, see that article, but enclosing a capsule with several seeds, of which the common apple and pear are true examples. But in the Linnæan genus *Sorbus* are some species, the Mountain Ash for instance, whose capsule is of so membranous a texture, as to approach the nature of the cell of a *bacca*, or berry. Hence Gærtner considers the *pomum* as one sort of *bacca* only; and hence the writer of the present article has, in the *Flora Britannica*, reduced such species to PYRUS; as will be seen in its place.

POMUM *Adami*, in *Anatomy*, the prominence in the throat, caused by the thyroid cartilage: it is observed only in the male, and has been so called in reference to a notion, that the apple which Adam attempted to swallow stuck at that part. See LARYNX.

POMUNKY CREEK, in *Geography*, a river of Maryland, which runs into the Potomack, N. lat. 38° 38'. W. long. 77° 12'.

PONADA, a town of Hindoostan, in the circar of Joodpour; 22 miles W. of Meerta.

PONÆA, in *Botany*, so called by Schreber, in memory of John Pona, an apothecary of Verona, who published in Italian a celebrated account of a journey to mount Baldus, with wooden cuts. In this work many descriptions and figures of Cretan plants are also given, and the whole is translated by Clusius in his *Plantæ Exoticae*.—Schreb. Gen. 266. Willd. Sp. Pl. v. 2. 470. (Toulicia; Aubl. Guian. v. 1. 359. Juss. 248. Lamarck Illustr. t. 317.)—

Class and order, *Ostaudria Trigynia*. Nat. Ord. *Sapiudi*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, in five deep, roundish, concave, spreading segments. *Cor.* Petals four, lanceolate, acute, larger than the calyx, tipped with hairy glands, and attached to the annular receptacle of the flower. *Stam.* Filaments eight, capillary, inserted into the same receptacle, the alternate ones largest, as long as the petals, and opposite to them; anthers ovate. *Pist.* Germen oblong, triangular, somewhat stalked; styles three, short; stigmas acute. *Peric.* Capsule of three cells, each with a wing of two valves. *Seeds* solitary, ovate.

Ess. Ch. Calyx in five deep segments. Petals four. Capsule with three cells and three wings. Seeds solitary.

1. *P. saponarioides*. Willd. n. 1. (*Toulicia guianensis*; Aubl. Guian. v. 1. 359. t. 140.)—Found by Aublet, on the banks of the river Sinemari in Guiana, twenty-five leagues above its mouth. It bears flowers and fruit in November, and forms a lofty tree, about seven or eight inches in diameter, known to the natives by the name of *Toulici*, the origin of Aublet's barbarous appellation of the genus. The leaves are winged, of many pair of unequal-sized, entire, veiny, smooth leaflets, the largest of which measure eight inches in length. Flowers in dense spikes, collected into panicles at the extremities of the branches. The stalks are downy. Petals whitish, small, like the other parts of the flower.—Nothing is mentioned concerning the qualities or uses of the plant, except that the wood is white and soft.

PONAKELLY, in *Geography*, a town of Hindoostan, in Golconda; 15 miles S. of Byarem.

PONARON, a town of Hindoostan, in the Carnatic; 15 miles E.N.E. of Volconda.

PONAVERAM, a town of Hindoostan, in Coimbatore; 10 miles W. of Daraporum.

PONCE, PEDRO, in *Biography*, a Spanish Benedictine monk, who flourished at the close of the 16th century, is supposed to have been the first person who taught the dumb to speak, and it has been doubted whether the abbé l'Epee, Braidwood, and others, have even yet carried this art to greater perfection. Among his pupils was the family of the constable of Castille, consisting of two brothers and two sisters. One of them, Don Pedro, who lived only to be twenty years of age, spoke and wrote Latin as well as his mother tongue, and was at the time of his death making considerable progress in the Greek language. His own account of him is thus recorded: "Know sir," addressing himself to a friend, "that when I was a child, and knew nothing, even as a stone, I began first to write down the things which my master shewed me, and afterwards I wrote down all the Spanish words in a book which was made for that purpose. Afterwards, with God's assistance, I began to spell, and then to pronounce with all the force I could, though much saliva came from me. After this, I began to read history, and in ten years have read histories of all the world, and then I learnt Latin. All this was by the great mercy of God, without which no dumb person can proceed." Mr. Southey says, that "another of Ponce's pupils became a Benedictine monk, and was able to make confession, and explain his creed by word of mouth." Gen. Biog.

PONCELETIA, in *Botany*, a genus dedicated by Mr. Brown to the memory of the Abbé Poncelet, a French botanist, author of *Histoire Naturelle du Froment*, an octavo volume of 387 pages, with nine plates, published at Paris in 1779, in which the anatomy of wheat is very minutely detailed.—Brown Prodr. Nov. Holl. v. 1. 554.—Class and

order, *Pentandria Monogynia*. Nat. Ord. *Epacridea*, Brown.

Ess. Ch. Calyx leafy. Corolla bell-shaped, five-cleft, beardless. Stamens inserted into the receptacle. Anthers peltate below their middle, their partition bordered. Scales beneath the germen none. Receptacles of the seeds attached to the central column of the capsule.

1. *P. sprengelioides*. Br.—Native of the country near Port Jackson, New South Wales, in marshy places. A small upright slender shrub, whose branches become at length naked, but not annulated; the flowering ones brittle. Leaves with a tubular half sheathing base. Flowers terminal, solitary, erect. Calyx imbricated with smaller leaves. Anthers beardless and unconnected.

PONÇIN, in *Geography*, a town of France, in the department of the Ain, and chief place of a canton, in the district of Belley, seated on the Ain; seven miles N. of St. Rambert. The place contains 2511, and the canton 7956 inhabitants, on a territory of 90 kilometres, in 6 communes. N. lat. 46° 5'. E. long. 5° 25'.

PONCTUER, in *Fr. Music*, to point or phrase a melody, and mark the reposing places more or less strongly: or rather to divide the phrases in such a manner, as to be felt by the hearer.

POND, in *Geography*, a little lake, which neither receives nor emits its waters into any river.

POND, in *Rural Economy*, a reservoir, or receptacle for collecting and preserving water, for the use of cattle or other purposes, usually dug out of the ground.

The importance and necessity of water, in all pastures, is self-evident, as cattle cannot live without it; and the driving them far to it is known to be prejudicial to their health in hot weather, besides being attended with great trouble, and a considerable loss of time. This is so sensibly felt in many parts, that people are obliged to dig wells, even to such a depth, as frequently to require the assistance of a horse to draw up the water. The means of rendering it easily come at must, therefore, enhance the value of the land where it can be procured, and are of very essential consequence to the husbandman. Where the surface of the ground is sand or gravel, there seldom is occasion to dig deep for water; because such soils generally lie upon marle or some other rich earth, through which the water cannot descend. Beds of clay are most commonly thicker than those of sand or gravel; and chalk is often the thickest of all. But wherever water is wanting, the farmer should bore through the incumbent earth, if he intends to fit his land for pasture; and if he finds the expence of obtaining it too great, his best way will be to convert the ground so circumstanced into arable, or to plant it with timber-trees, suited to the nature of the soil and situation.

Various indications of the presence of water below the surface of lands have been suggested by the ancient writers on husbandry; such as the spontaneous growth of different aquatic plants, vapours near the surface, &c.; but the best mode of ascertaining it is by boring; and about the latter end of August, when the ground begins to be a little moist, is probably the most proper season for the purpose. But in whatever method water be found, the means of coming easily at it are the next consideration. If it be on a plain, there is no other way than digging a well. In doing this, the substance under the sand or light soil must be dug into, to form a reservoir of water for occasional wants; and this reservoir should be made deep and large in proportion to the quantity wanted. If there were no such reservoir, the water, after having risen a little above the impervious body underneath, would glide along its surface, as usual, and very little of

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it could then be obtained, either by pumps, buckets, or any other way employed to raise it. If the well is made in a sloping ground, and the declivity is sufficient to give it an horizontal vent, it will be worth the husbandman's while to dig such a passage, and by means of pipes, or any other conveyance, to carry the water across the light soil, through which it would otherwise sink: the greatest quantity of water will be obtained in this manner, because there will then be a continual stream. If the soil is very deep, and its surface has inequalities, in which rain water runs in any quantity, this may be collected in ponds made in the lowest parts of such grounds.

But where a body of clay is found near the surface, it is worth the farmer's while to bore, that he may know at what depth a bed of sand or gravel may be met with; for he will be sure to find plenty of water in this last. If this be in a declivity, he need only cut an horizontal passage, and the water will flow so freely, as even to double the value of his land. Here, again, the farmer needs not ever be at a loss, because it cannot be very difficult to make a pond in a clayey soil, which is, of itself, retentive of water. But it may perhaps be advisable, even in this, to cover the bottom of the pond with a coat of gravel, in order to prevent its being poached by cattle, whose feet would otherwise be apt to sink deep into the clay. Some farmers judiciously pave the declivity by which the cattle enter into the pond, and this renders it much more lasting than it would otherwise be, and preserves the water clean.

In cases where ponds are made in a loose soil, much more care is necessary. The bottom and sides must be covered with a thick coat of the toughest clay, from a foot to two feet thick, well rammed down. Some have added hair and loam to the outer part of this covering, with a view of rendering it less liable to chap; but a thick coat of gravel is more necessary here, that the feet of the cattle may not pierce through the clay. Perhaps the expence of paving the whole inside of a pond might, in the end, be money well laid out.

There is the greatest difficulty in finding water in chalky soils; because these are not, in themselves, very retentive of it, and generally lie in such thick beds, that it is expensive to dig through them. However, it should be tried; and if sand or gravel be found underneath, water may be depended upon. Even here, ponds are easily made by digging into the chalk, and lining them with a coat of clay, as before directed. If there is a supply of proper manure, such as clay, or marle, this situation is well adapted to grain, which loves to stand dry; and as this kind of ground produces more forward crops than clayey or strong soils, it may be sowed early with corn, which will not, in that case, be so apt to be parched up as grass is, by the summer's drought. If a good soil can be made here a foot deep, it will yield plenty of various sorts of pasture, either roots or grasses, as the farmer shall judge most proper: or it may be planted with different kinds of timber trees.

There are different methods of constructing ponds, but the following has been proposed in the sixth volume of the *Annals of Agriculture* for the Yorkshire wold land, which is a dry tract of country, in order at all times, and in all situations, to supply water sufficient for the numerous flocks of sheep, and other cattle, kept upon it, and sufficiently good in quality for domestic purposes. About twelve or fifteen years ago, a man, by profession a well-sinker, first discovered the method of making these ponds; within this period the number of them has been so increased, that scarce a sheep-walk, or even field, is now without one; and the use of them is creeping into the neighbouring country,

in situations where otherwise water could not be had: so sudden and general an adoption is sufficient proof of their utility: before this period many sheep-walks were entirely destitute of water; it is, however, worthy of remark, that most of those sheep which have now a constant supply of water, are, by many intelligent persons, thought, from that circumstance only, to be considerably improved; whether, however, this opinion is well founded, the writer cannot, from his own experience, assert, not having had opportunity to make the necessary observations; but it does not admit of a doubt, that in very dry weather, much fewer sheep die than formerly: this, in several instances, was fully proved during the uncommon drought of a late summer, where the loss among sheep which had not this resource was very great, while that among others of the same kind, and in similar situations, which did not labour under the want, was very trifling; perhaps not greater than would have taken place in any other equal space of time. This plan is shewn in the *Plate* on the potatoe-harrow and set-scoops, in which the line A marks a circular hole dug in the ground, of the size required, upon which a layer of clay, B, sufficiently moistened, is to be carefully beaten and trod down into a compact and solid body, of about the thickness of a foot. Upon this, C is a layer of quick lime, finely and uniformly spread over the whole, of one inch or upwards in thickness. D is another layer of clay about one foot in thickness, which is to be trodden and rammed as the former; upon this are spread stones or coarse gravel, E, of such thickness as may prevent the pond receiving any injury from the treading of cattle, which would otherwise break through the body of the clay and lime, and by so doing let out the water; after this, according to the section, the pond will remain five feet deep, and forty-five feet diameter; the size they are usually made, F being the line of the water and of the ground. Brick-clay is by no means required for the ponds; any earth sufficiently tenacious to bear beating into a solid compact body, though not approaching to a pure clay, will answer the purpose very well.

It is usual, where there is an opportunity, to make the pond in a little valley, or at the bottom of a declivity, or near a high road, in which situation a stream of water may be brought into it after sudden showers or thaws; the object being to get it filled as soon as possible after it is made, that the sun and winds may not crack the clay. If it is not likely to be filled soon, some straw or litter must be spread over it; but in general, after it is once filled, the rains that fall in the course of the year will keep it full, no water being lost otherwise than by evaporation and the consumption of cattle. A pond of this size is usually made from 4*l.* to 6*l.*, exclusive of the time, and the expence of the carriage of the clay, when that is necessary: the first varies in price in different counties; the last will depend upon the distance. The whole excellence of the pond depends upon the lime; care must be taken to spread it regularly and uniformly over the surface of the lower bed of clay. It is well known, that ponds made with clay alone, however good its quality, and whatever care may be exerted in the execution, will frequently not hold water: these, with the above precautions, rarely fail. Never having seen a pond dug up, after it had been made some time, the writer cannot say by what means the lime prevents the loss of water. One of these two is probably the cause: either the lime sets like terrace into a body impervious to water; or, what he should rather think, the causticity of the lime prevents the worms, in dry weather, from penetrating through the clay in search of the water. Certain, however, it is, that with lime thus applied, ponds may be made in sand, however porous; or

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on rocks, however open : in neither of which situations are they to be depended upon, when made with clay alone.

But on this mode of making ponds for the use of live stock, there are several circumstances of the process more fully detailed in the Rural Economy of Yorkshire, under the heads of, 1st, the run, or collecting surface; 2d, the reservoir; 3d, the liming; 4th, the claying; 5th, the covering; 6th, the time of making; and, 7th, the cost.

On the 1st, or the run, the author remarks that a bare firm surface, as a road, collects the greatest quantity of water; but that a grassy surface retains the rain-water which falls upon it, and which, in level situations, is conducted into the soil by worm-holes, and other inlets, with which grass land generally abounds, especially in summer, when a collection is of the greatest value. However, if the subsoil be retentive, ditches, especially of arable inclosures, will frequently afford a supply, even in summer; but in an upland situation, where the subsoil is generally absorbent, a road, or an artificial run, becomes necessary. But that in upland districts, as the wolds of Yorkshire, and the downs of Surrey and Kent, the surface is generally broken into hill and dale, and diversified by smaller vallies and inequalities. In situations of this kind artificial runs are most wanted, and may be most easily made. The writer has seen some faint attempts at making them, on the wolds of this district, by cutting a few grips, with a spade, above the reservoir; but they were too few, too short, and too seldom scowered, to answer, in any considerable degree, the intended purpose. They nevertheless shewed plainly enough the utility of channels for catching hasty showers, falling on grassy slopes, off which a considerable quantity of water will escape, provided there be channels at proper distances to receive it. But in order to reap the greatest benefit from an artificial run, and to make it with the greatest ease, it is advised to form the basin at some considerable distance from the head of a valley; from which, down to the reservoir, to open a main channel by two furrows of a plough turned outwards. From this main stem to plough lateral branches, with an easy descent towards it, along the sides of the slopes, by single furrows, turned down hill; by which means the ploughing will be rendered easy, the channels made free on the upper sides for the admission of water, and high on the lower sides for retaining it. And the plough would not be less expeditious in scowering than in making the channels; or, perhaps a more sledge-like implement would be still more effectual than the plough, in closing the fissures and worm-holes, which presently are formed in water-courses laid dry, and which, if left open, absorb an inconceivable quantity of water before they be saturated, especially if the current of water be retarded by grass, or other obstructions that may be formed in them.

In relation to the 2d, or the reservoir, the situation for them should depend principally upon the run. Near the side of a road is, in general, the most desirable situation, provided a sufficient descent can be had from the road to the reservoir. Roads leading along the sides of slopes can only afford a supply to the grounds on their lower sides. But in this country, when a road leads down the descent, it is generally furnished on both sides with ponds, some of them, perhaps, not having more than an hundred yards of run off a narrow roadway; yet, from that small quantity of surface, are sufficiently supplied with water. In the situation of a pond there is one thing requisite, which does not seem to be attended to, even by the most skilful in the art. This requisite is that of admitting a waste water place, on the upper side of the reservoir, to prevent the water, when the

pond is full, from running through it; by which means it becomes filled up unnecessarily. For the nature of foul water is such, that, whenever it changes from a current to a stagnant state, it deposits a considerable part of its foulness; so that the water that leaves a full reservoir is finer than that which enters it, the sediment, of course, being left behind in the reservoir: whereas, if the current into the pond were to cease when the pond is sufficiently filled, the sediment of the overplus water would be got rid of. The pond would receive, in this case, no other foulness than that which was given by the quantity of water requisite to fill it. The writer thinks that a small catch pool, between the run and the reservoir, would arrest much of the foulness of water collected from a road; and, in a situation which could admit of it, would be worth the trouble of forming. In many situations, the mud it might collect would amply repay the expence of forming it.

The form of the reservoir is universally that of a shallow basin, or, more strictly speaking, that of a flat cone inverted; the sides shelving straight from the brim to an angle or point in the centre. If the excavation be made sixty feet diameter, its greatest depth is about seven feet; if forty feet diameter, its greatest depth is about five, before the coats of clay, &c. be laid on. And a reservoir set out twenty-two yards diameter, by seven feet deep, will, when finished, measure about sixty feet by six, and will hold about two hundred and ten cubical yards, or near seven hundred hogsheds of water. Forty feet diameter, by four feet deep, when finished, contains sixty-two cubical yards, or two hundred hogsheds of sixty-three gallons, wine measure.

The first business in setting out a reservoir is to take the level of the site, and drive piles, as a guide in forming the banks, and in making the conducting channel and waste water place. If the situation be on a slope, the excavated mould is used in forming the bank on the lower side; if nearly level, the mould requires to be removed, or, if laid round the edge, the conducting channel to be raised. But if the clay or stone be excavated, it is laid separately aside, to save carriage. And if the lower side be raised with the excavated materials, they ought to be firmly worked together, or should lie a sufficient time to settle; otherwise the side, thus formed, is liable to settle after the reservoir is finished; by which means cracks are formed, and a miscarriage ensues. When the excavation has received the intended form, its sides are made firm and smooth, for the reception of the lime, or first coat.

In regard to the 3d, or liming, its use is merely that of preventing earth-worms from perforating the coat of clay. The proper quantity depends, in some measure, on the nature of the soil. A fat rich earth, among which worms always abound, requires more than a dead hungry mould, or a dry stony bottom; on which retentive pools are said to have been made, without lime. However, as no soil, perhaps, is entirely free from those enemies to ponds, it would be folly to risk a miscarriage in any situation; as the expence of liming makes but a small portion of the whole expence; and the only preparation of the lime is that of slaking it, and picking out the cores; no sifting or screening being in general used, though obviously useful, where it is usually laid on with a spade or shovel; but a sieve would perhaps be found, by the inexperienced, a better tool, and the extra labour no object; and the thickness of the coat laid on is about half an inch. Half a chaldron of lime is sufficient to complete a pond of forty feet diameter. The principal part of it is laid on beneath the clay; a few bushels only being reserved

reserved for scattering round the edges, to prevent the worms from getting into the clay. A still more secure, and, on the whole, a more eligible, method of liming has lately been thought of, and is now (June 1787) in practice, at Lockton, by the commissioners of inclosure, in making public drinking pools, for the use of the township. Instead of scattering the lime in powder, it is formed with sand into mortar; a regular coat of which is spread about an inch thick, not only beneath, and at the edges of the clay, but over the entire surface. This is an obvious improvement, which appears to human foresight to bring this method of forming pools near to perfection. The clay becomes cased on either side with a regular coat of cement, and is thereby secured, in perhaps the completest manner possible, from the attack of worms. The labour and expence, however, are by this method increased. A pond, nineteen feet diameter, took two chaldrons and a half of lime, and five small cart-loads of sand. Both the materials were sifted, and worked up in the usual way into mortar. Great caution is necessary in laying on the clay, in this case. And if the mortar does not lie some time to stiffen, the clay displaces it: if it get too dry before it be covered, it is liable to crack.

In respect to the 4th, or claying, it is in this operation the manual art and the labour principally centre. And upon the wolds, clay is sometimes fetched six or seven miles, and is seldom found at hand, in situations where artificial pools are most wanted: the carriage of the clay, therefore, generally becomes a heavy article of expence. But the choice of clay is thought to be less essential than the working of it. Good ponds are said to have been made with common loamy mould; but it is wrong to depend on any thing but a strong ductile clay, if it can be had within a moderate distance. And the thickness of the coat, now pretty generally laid on, is about five or six inches in the rough, beating it down to about three inches. In the infancy of the art, two coats of clay, of about that thickness, were laid on; but one coat has been found effectual, and much less expensive. However, it is probable it will not prove so durable. The method of beating will be difficult to describe, yet it most especially requires description. The drier the clay is worked, the less liable it will be to crack with drought, when finished. In a dry season, however, it is necessary to moisten it: for which purpose, the centre of the pit is sometimes finished first, to collect the water of showers; the carriage of water being in some cases expensive. In executing the work of laying on the clay, the workmen begin at the bottom of the pit, and work upward; laying patch after patch, or circle after circle, until the brim be reached; taking great care not to carry on sticks, straws, dirt, or any kind of foulness, among the clay, or with their feet; and being careful not to displace the lime, in throwing it on: to prevent which, the lime is not spread over the whole at once, but is scattered on, as it is wanted to be covered with the clay. And as soon as a plot of clay is laid on, and adjusted, it is beaten flat with a wooden "mell," or beetle, made at present of these dimensions: the head fourteen inches long, and three inches diameter; the handle four feet long, and suited in thickness to the hand of the workman. Beetles of different sizes have been in use, in different stages of the art; but none of them have been found to be so well adapted to the operation as that in use at present. The first operation is performed with the side of the beetle, to level the protuberances, and smooth the roughness, so as to make the whole into a regular sheet of an even thickness. And when

this is effected, it is struck forcibly with the end of the beetle, which is driven down nearly, but not quite, to the lime; leaving the surface full of somewhat honey-comb-like cells or dints. If the beetle be struck unguardedly quite through to the lime, a piece of clay, and a little lime, if required, is carefully placed in the breach, to prevent a defect in the part thus injured. And the whole being gone over, in this manner, with the end, the surface is again levelled down with the side of the tool; the workman passing backward.

The next beating is with the end, but not quite so deep as before; and the roughnesses being again levelled with the side, it is again worked over with the end, but still shallower than in the middle beating. The first strokes with the end of the beetle ought to close the bottom of the clay firmly with the lime, and the bed on which it is spread; the second ought to unite the middle of the clay with the bottom; and the last to close, without a pore, the upper part with the middle; and the last strokes, with the side of the beetle, ought to be sufficiently forcible to close entirely the dimples formed by the last given strokes with the end. When these several operations are thought insufficient, it is continued to be worked with the end and side of the beetle alternately, until not a flaw can be found; the entire coat of clay being manufactured into a lead-like sheet, firm enough to bear a man without an impression, and a horse without injury. And when two coats of clay were in use, the upper one was laid upon the rough surface of the last end-beating; by which means the two coats became, by the subsequent beatings, incorporated in one thick sheet: a substantial method this, of which the present appears to be rather a refinement, than an improvement.

In the 5th operation, or covering, the first coat is of common earth, to assist in keeping out the drought, and to make a bed for the stones; to prevent their asperities from piercing, and thereby injuring the sheet of clay. This coat may be three or four inches thick, according to the nature of the stones with which it is to be covered. If these be large and irregular, more earth is requisite than when the stones are small, smooth, or flat. The leanest, most infertile soil is fittest for this purpose. Worms and weeds are equally to be feared, and a rich soil is genial to both. In this point of view, two coats of clay are much preferable to a coat of clay and a coat of rich mould. The persons employed in this sort of business are not sufficiently aware of the mischievousness of weeds: indeed, some ponds will remain, for several years, in a manner free from them; but there are others, in which weeds, even docks, (near the edge,) have grown luxuriantly. It is probable that the tap-rooted weeds strike through the several coats; and whenever the roots decay, a perforation must be left. And mould taken from a dry found highland situation is, in all human probability, less liable to propagate aquatic weeds, than the earth of a low situation or bog. The following is an ingenious and simple method of keeping the weeds under, especially at the edges, where they are generally most abundant. Though all the sides of a drinking pool be open, cattle will go to particular places to drink; and in these places the weeds are trampled upon and killed: therefore, to check the rankest, the parts which are most free are covered with thorns, while those which are weedy are left open for the cattle to drink at.

The mould being rendered level and smooth, the stones are laid on: first covering the mould with the largest, laid with a flat side downward, to prevent their sinking down to the clay; and upon these laying smaller, until the coat be made

made five or six inches thick. Straw has been used between the clay and the stones; and that in the instance in which an improved method of liming was practised, a layer of thick fods was laid, grass-side downwards, upon the lime; and upon the fods, about six inches thick of loose stones.

Mr. Marshall, however, suggests that a pavement would be a more regular covering; and, if the stones were set in lime and sand, would not only prevent worms from getting into the mould, and upper side of the clay, when the pond happened to be dry; but would, in all probability, prevent weeds; and when the pond required to be cleaned from mud, would be a regular floor to work upon. And the only objection he has heard made to paving the bottoms of ponds is, that it would be a temptation to cattle to go into the water in hot weather; and by standing there, would not only foul the water, but in time tread up the pavement, and injure the clay; whereas sharp loose stones prevent their going farther than the edge. If the stones made use of in a pavement were sufficiently large, the latter part of the objection would fail; and whether cattle standing in a pool, in summer, be detrimental or beneficial may be a disputable point. But that whether or not the inside of the basin ought to be paved, the rim should certainly be a broad smooth causeway, with a gentle grassy slope from it; especially on the lower side, that the cattle may approach the water, without wading in dirt, to the injury of the bank; and without having sharp loose stones to walk and stand on while drinking. He thinks that a drinking pool, formed by a skilful artist, full to the brim, free from weeds, and smooth round the edge, is, in a green pasture ground, as agreeable an object as the eye can be entertained with.

In respect to the sixth, or the season of making them, the autumn is esteemed the best time, as has been seen above. Drought and frost are both enemies to new-made ponds. In autumn, drought has generally abated, and a sufficiency of rain water may be expected in this season, to fill them before frosts set in. A covering of straw over the stones is the usual guard against the extremities of seasons. And where a reservoir is formed in a slope, where the lower side requires to be raised with loose earth, it ought to remain a considerable time to settle before the coatings be put on; otherwise it is liable to settle afterwards, and crack the clay. He has seen an instance of miscarriage through this neglect. If there be much made earth requisite to be raised, the excavation ought to be formed twelve months before the claying is done.

But in speaking of the 7th, or expence, Mr. Marshall remarks, that though it is now twenty years since the discovery was made, the art is still partially hid under the veil of mystery; and is not yet become familiar to common farm labourers. In this neighbourhood, ponds still continue to be made by men from the wolds; all of them, in reality or pretence, pupils of the first inventors. And these men generally work by the gross; the price being in proportion to the diameter; but they seem to have no regular method of calculation. Ten pounds were formerly given, and may now be considered as a medium price, for twenty yards diameter; forming, claying, covering, and, generally, digging the clay, included; all carriage and extra labour being done by the employer. But in the early days of the art, and when two coats of clay were used, twenty pounds were given for ponds of this dimension. A circle twenty yards in diameter contains in its area 314 square yards. Therefore, each square yard of surface costs, at this price, seven-pence halfpenny. And that the solid contents of a cone, whose base is 60 feet diameter, and whose height is six feet, is 209.4 cubical yards; each of which costs, in the above instance, eleven-pence halfpenny. And five pounds have been given for a pond

twelve yards in diameter; which is ten-pence halfpenny each square yard of surface; and supposing it four feet deep, two shillings each cubical yard of water. And three guineas were given for forty feet diameter, and four feet deep, the excavation having been previously formed. This may be called four pounds for the gross; which is about seven-pence a square yard of surface; or fifteen-pence halfpenny each cubical yard of water. The men, in the last case, earned about three shillings and sixpence a day, without extraordinary exertion. In the first-mentioned instance, the same workmen did not (according to their own assertion) make more than two shillings and sixpence a day. But a large pond gives longer employment; and the business of pond-making being uncertain and inconstant, travelling workmen can afford to make a large pond at a cheaper rate than a small one. And the curve superficies or superficial contents of the sides, of a cone twenty yards in diameter at the base, and two yards high, is about 320 square yards. This, in making a pond of those dimensions, is the quantity of coating: for each yard of which near seven-pence halfpenny was given in the first instance, and less than seven-pence in the last. Sixpence each square yard of surface to be coated, may perhaps be taken as a fair medium price. At present, however, work of this sort is performed at a much higher price, as from ten-pence to a shilling, or more.

But to ascertain the quantity of coating to be done, it is advised to measure the exact circumference or rim of the pit, when finally formed and adjusted for claying; this dimension multiplied by half the length (or depth) of the side (measuring from the brink, down the slope, to the centre), is the quantity of surface to be clayed and coated. The digging would (under this mode of calculation) fall proportionably heavier on a large pond than on a small one, but this would be counterbalanced by the advantage above-mentioned.

The quantity of clay used, in the first instance, was about forty cart loads, fetched about three miles: in the last, about fifteen loads, fetched one mile. The quantity of lime in the former case, one chaldron; in the latter, half a chaldron.

On these principles it is plain, that the larger the pond, the less in proportion is the expence. A reservoir, to contain 200 cubical yards of water, requires little more than 300 square yards of coating; whereas one, to contain only 50 yards of water, would require 120 yards of coating; consequently, a cubical yard of the former would only cost (at nine-pence a yard for manual labour, materials, and carriage) eighteen-pence; while the same quantity of the latter would cost near two shillings and sixpence. This is, therefore, a point that should be attended to where this sort of work is to be performed.

The superiority of those ponds made in the manner above described, to those which have formerly been made by some other art, or which have been formed by nature or accident, may be mentioned. During the dry seasons which have prevailed of late years, it has been observed that newly made ponds retain a supply of water, when the waters of other stagnant drinking places are dried up. This can only be accounted for, perhaps, by their perfect retentiveness, and by their being free from weeds, which convert to their own nourishment, and throw off daily, by perspiration, a great quantity of water. Upon the wolds their excellence was most conspicuous:—while one man was driving his stock three or four miles to water, his neighbours, who had *made ponds* upon their farms, were free from this serious inconveniency. In many situations artificial ponds may, the writer thinks, repay the expence of making the first dry season. Driving stock to distant water in hot weather, and in a busy season,

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is an expence, and a detriment to the stock so driven, which it would be difficult to estimate in many instances.

This important subject is concluded by remarking that on examining ponds in this neighbourhood, which have been made some years, the evil effect of covering with loose stones is evident. As for one, two, three, or more yards round the edges, according to the time they have been made, the use they have been liable to, and to the steepness of their sides,—the stones are entirely displaced, or trodden into the clay; which is, by this means, exposed to the feet of cattle, and to the open attack of drought and worms. For a while the clay, even thus exposed, preserves its retentiveness; but, in time, it is destroyed, and the most valuable part of the pond entirely lost. The writer adds, that this effect is so probable, so evident to be foreseen, that, on the first reflection, it seems astonishing so unsuitable a covering should be universally adopted. A beast, when it goes into a drinking pit, necessarily throws the chief part of its weight upon its forefeet; which, in the act of drinking most especially, are placed, as for the intention of forcing whatever they stand on down the slope, toward the bottom of the pit. Upon loose stones, laid on a steep surface, cattle cannot make a step, or move a foot without producing this effect in a greater or less degree, and by repetition and length of time, the entire coat (except some few stones which happen to be trodden into the clay) must, in the nature of things, be forced into the centre. But this absurd practice was first established upon the wolds, whose stone is of a perishable nature,—a species of chalk; which, on being exposed to air and water, and to the treading of cattle, unites into a cement, which, forming a regular casing, preserves the clay from injury for a considerable length of time. Loose chalk as a covering was, therefore, a good thought of the first inventors (indeed upon the wolds there was no alternative); and it is not to be wondered at, that their pupils, mostly day labourers, should imitate the practice in this country, by making use of loose stones for the purpose. But perishable or soft stones of any species, a strong rough gravel, or even sand, would, the writer believes, be better than loose hard unperishable stones. Though in this neighbourhood, where stones of various kinds abound, or in any country where stones of a proper size can be procured at a moderate expence, there appears to him to be no choice with respect to covering. A regular firm pavement, strong enough to bear stock without an impression, would last through ages; and although the expence, in the first instance, would be something more than that of loose stones, its durability would, in the end, doubly repay it. Even the wold ponds, which have been made fifteen or twenty years, are many of them beginning to fail, and will, in a few years more, require to be fresh coated; whereas, a pond properly paved would, in all human probability, remain perfect for at least a century. Where rough stones are used, they should be placed with the smooth side downwards upon the clay. And besides this, the pavement of stones has, the writer thinks, much less tendency to be disturbed by the pressure of the feet of the animals, from its being a sort of inverted dome, which acts as an arch against the materials underneath it.

The following hints have been suggested by Dr. Anderson in his "Recreations in Agriculture, &c." for collecting water in different cases for farm uses, in situations where it is not easily procured.

For this purpose he would beg leave to direct the attention to one never-failing source of water in this island, which, if duly husbanded, will certainly, he says, preclude the danger of want at any season, for almost any purpose, either

for man or beast, that can ever occur. He here refers to the rain that falls upon the roofs of houses, which amounts to a much greater quantity than most persons are aware of. It has been ascertained by repeated experiments, that in scarcely any part of this island does there fall less than twenty-eight inches deep in a year. At this rate there will fall upon every square foot of roof of any house above seventeen gallons and a half of water; or upwards of two hogsheds and a half on every square yard. At that rate, a house of thirty feet in length and twenty in width (which is not larger than an ordinary cottage), would collect one hundred and seventy-five hogsheds in a year, which would afford the expence of half a hogshed a day. There are few farms with their offices that have not roofs to ten times the extent of the above; so that were this water all preserved, they could expend at the rate of five hogsheds a day throughout the whole year, which would be sufficient for a very extensive stock of cattle. But when we consider that in almost every situation cattle can be easily supplied with water from other sources for the greatest part of the year, it will appear very plain, that if all this water were carefully preserved, no farm could ever be in want of water for cattle or other purposes. All that is wanted then is, to discover an easy manner of collecting and preserving that water till it shall be wanted; which he proceeds to shew is not a difficult matter. Few houses are now built, without having spouts placed along the eaves to collect the rain-water and convey it into a reservoir, usually a wooden cask, for the purpose of washing. But this reservoir is usually so small as soon to be filled, when the surplus runs over and is lost. Instead of that, let the whole of the water thus collected be led by pipes to one place, where it may be let into a well, dug in the ground to a proper depth for that purpose, and covered at top. It will there be screened from the sun, and prevented from evaporation, so as to be kept sweet and cool as long as necessary; and it is well known that no water is so pure and wholesome as rain-water. But to those who are peculiarly delicate it may occur, that some impurities may be washed off by the rain from the roof, which they would wish to get rid of. This may be easily and effectually done, by sinking another well at a moderate distance from the first, making a passage between the two near the bottom, to be filled up with small clean sand and gravel, through which the water must percolate before it reach the last well; in consequence of which it will be perfectly purified. The pump for supplying the family should be fixed in this last well, where it will of course find nothing but pure water.

But for the sake of cattle, if it be necessary, he advises that another reservoir be formed, also under ground near to the pump well, with which it may communicate by means of an opening at one side near the top of the well, through which the superfluous water will run off when it rises above that level. This may be made in the form of a trough, covered as far as may be found convenient, and open towards one end for the cattle to drink, without allowing them to set their feet in it.

In cases where the house is upon an eminence, it will be very easy to convey the water from this last reservoir, by means of a pipe under ground, to any convenient part of the fields or garden, where it may terminate in a box, to communicate with a trough for the cattle by means of a ballcock, which always allows water to flow into the trough as it is drawn off, and closes of itself when it is full, so as to keep it always full without ever running over. In this way abundance may at all times be had without any waste; and the pure element procured for the cattle, without any extravagance of expence. If pools are made in the
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lower places of the fields, the cattle may in these occasionally cool themselves: but if they have ready access to the troughs they never will drink there. But for fields which are at a distance from the house, where the surface of the ground is not a dead level, wells of this sort may be formed by collecting the water that flows over the surface of the ground, during rainy weather, and leading it into these wells. But these reservoirs should be always covered, and only have an open trough at one place to allow cattle to drink. He supposes that by these very simple contrivances many parts of the country that are now much distressed at times for want of water, may be effectually relieved, so as never to suffer any future inconvenience; and much expence in carting water to many villages might be entirely saved.

In the making of most other sorts of ponds, where the soil is of the more loose and porous kinds, it will be almost constantly necessary to have recourse to the same methods of management, only in particular cases it may not be requisite to make use of the limy material, which is rather expensive, and a good coat or lining of well wrought clay will answer every purpose perfectly well.

Wherever ponds or reservoirs of water are sufficiently high, they may be converted to the purposes of irrigation in many seasons with vast advantage to the farmer, without the use of machinery. Ponds are likewise beneficial for the purpose of breeding and preserving fish in many situations. See FISH-PONDS.

The management of the water of ponds is often very troublesome and inconvenient in the time of heavy rains or floods, from the want of proper means or contrivances for letting it off. The following is the sketch of a very easy, convenient, and effectual method of discharging the overabundant water from all sorts of ponds, basons, and reservoirs, without the necessity of attending to them at such seasons. It is the invention of Mr. Ley, a very ingenious clergyman in the county of Devon, in the agricultural report of which it is described. The plan of it is represented at *fig. 6.* in the *Plate on the Potatoe Harrow, &c.* in which A is the head of the pond; B, a beam of wood, suspended by an iron pin on the block W, so as to form a sort of lever, or balance, having attached to one end of it the box C, which is made so as to be rather leaky, and to the other the plug D, which, when the water of the feeding stream, or from rains, rises to the level of the surface of the pond F, is conveyed through the trunk or gutter, X Z, into the box C, by the weight of which the plug is drawn out, and the water carried off by the trunk E, at the bottom of the pond, as seen by the letter G. On account of the box, C, being so constructed as to let out the water very slowly, by the time the whole of the water has been discharged from the pond, bason, or reservoir, it will likewise have escaped from it, when, by the weight of the beam and plug, the empty box is raised, and the plug again placed in the trunk in its former situation.

It is evident that, from this ready method of getting quit of the water, no mischief can ever be sustained by its sudden rising and overflowing the banks of the ponds or other excavations, accidents which, under other circumstances, not unfrequently happen, to the great inconvenience and injury of those to whom they belong.

POND-Fisheries, in *Rural Economy*, are such as are formed in ponds, where the water is, for the most part, in somewhat a standing state. Ponds of this nature are occasionally met with in the county of Middlesex, as well as many others in different parts of the kingdom; but they are more attended to in Suffex, and the neighbouring counties, than any where else, in the view of producing fish for the purpose of sale.

There are ponds provided in various places in the above-named county for this use, and the raising of fish in them is an object of some consequence to the inhabitants. The ponds in the wolds are said to be innumerable; and numbers of them date their origin from that part of the county having once been the seat of an extensive iron manufactory, which has now deserted the country; and the mill-ponds now also raise large quantities of fish. A Mr. Fenn, of London, has long rented, and is the sole monopolizer of all the fish that are sold in this county. Carp is the chief stock; but tench and perch, eels and pike, are raised. A stream should always flow through the pond; and a marly soil is the best. Mr. Milward has drawn carp from his marle-pits 25lb. a brace, and two inches of fat upon them, but then he feeds with pease. When the waters are drawn off, and re-stocked, it is done with stores of a year old, which remain four years; the carp will then be twelve or thirteen inches long, and if the water be good, fourteen or fifteen. The usual season for drawing the water, is either the autumn or spring; the sale is regulated by measure, from the eye to the fork of the tail. At twelve inches, carp are worth 50s. and 3*l.* per hundred; at fifteen inches, 6*l.*; at eighteen inches, 8*l.* and 9*l.*; a hundred stores will stock an acre; or thirty five brace, ten or twelve inches long, are fully sufficient for a breeding pond. The first year the young fish will be three inches long; the second year seven; the third year eleven or twelve; and the fourth year fourteen or fifteen. This year they breed.

In stocking the ponds here, store fish of all the different sorts are made use of, both while very small, and when they are from two or three to eight or nine inches in length.

In Burton park, in this district, Mr. Biddulph has a fine reach of water, which yields carp, tench, perch, pike, &c. in great abundance, and from which vast quantities are occasionally taken and sold.

At Mitchel grove, sir John Shelley's pond, which contains one acre and thirty poles, and is fished once in three years, affords each time about 2*l.* 6*s.* 8*d.*, besides a sufficiency of young fish to stock two ponds.

Lord Egremont has several noble ponds for breeding, and others for fattening, one immediately under another, with streams running through them. They are fished every third year; and the best fish reserved for the stews; but none sold.

The tench remain for two fishings in his lordship's ponds, as they are a slow growing fish. At the last fishing of one of these ponds, three hundred store tench, and as many store carp, were put into it; the stores are worth 10*s.* 6*d.* a hundred. Male tench are good for nothing, and are thrown away; hen tench only are preserved. It is rather difficult to mark the distinction between the male and the female. Male perch are known by the appearance of milk upon squeezing; tench by the thick fin of the males. If the waters are good, about seventy two-years old store carp, and as many tench, are a fair allowance for one acre hereabouts.

In the Berkshire Report on Agriculture, it is stated that E. L. Loveden, esq. has two fine pieces of water, which apparently unite, covering thirty-three acres of land; and which produce plenty of pike, sometimes of very large sizes, as eighteen or twenty pounds weight each, eel, carp, tench, perch, trout, &c. Also about the parishes of Oakingham, Hurst, Lawrence, Waltham, and Ruscombe, there are many gentlemen who have natural or artificial fish ponds, which are let to tenants, and produce every third or fourth year a crop, if it may be so termed, of carp and tench. The occupiers stock them with yearlings about two inches

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long, obtained chiefly from Yately, on the neighbouring confines of Hampshire. The breeders are about eight or nine pounds weight there; but in the Berkshire ponds they are never suffered to breed, but are sold off to the inns at Henley and other places, when the ponds are drawn, which is generally once in four years, and weigh, at that age, about three or four pounds each. The value of the land thus applied, cannot, it is supposed, average less than about twenty shillings the acre. S. Nicholls, esq. of Hinton-house, observes, on this subject, that "the ponds are regularly laid empty, and the fish with which they are stocked, which are uniformly carp and tench, are taken out every third or fourth year. The pond is afterwards allowed to lie fallow for the remainder of the summer season, and is again stocked early in the ensuing year with yearling fry of the same species. The ponds thereabouts, it is remarked, are all subject to an abundance of coarse, bony, insipid fish, denominated Prussian or German carp. As the species is carefully destroyed, it is wonderful, it is said, that they should increase with the rapidity and universality which they appear to do; the spawn must be plentiful, and singularly prolific. With respect to the profit, it is so variable, according to the varieties of situation, and exposure to the running of yards, as well as the aptitude to receive nutriment from animal or excrementitious matters, that no general estimate can possibly answer the question about it satisfactorily. Every acre of a pond, properly stocked and well situated, must, in the writer's apprehension, produce an annual increase of from eighty to one hundred pounds weight. If artificially fed, the increase will be greater, or less, if the pond is not so situated as to receive manure from the circumjacent lands. By retail, the fish here are generally sold at a shilling the pound; but under particular circumstances, they may sometimes be had as low as ten-pence.

It is noticed that Mr. Toomer of Newbury is famous for producing trout of a very large size in his stews. Not many years ago he had three fish of that species which weighed fifteen pounds each; two of them had been fattened by himself, the other was of that weight when taken out of the Kennet. At another time he had a trout which grew until it attained the weight of seventeen pounds, when it was given to the late lord Craven, who sent it as a present to his majesty.

The writer of the report mentioned above, dined, he says, in 1805, at Newbury, in a party who had, the day before, feasted on a trout weighing fifteen pounds and a quarter, and which had been fed in a stew for about eighteen months. It measured thirty-one inches in length, twenty and a quarter in circumference, and the length of the jaw was nine and an eighth inches. A trout of one pound and a half has, in the space of a year, grown in a stew to the weight of eight and a half. Instances indeed have been known of a trout growing a pound in the course of a week.

In this district, Mr. Loveden is likewise the contriver of a plan for a fish-house which cannot be robbed. It is built on a small point of land surrounded on three sides by a branch from the Thames, and has iron grates to the east and the west, to allow the water a free passage. Within the limits of the building, whose exterior appearance is that of a neat cottage, are three stews, about eight feet deep from the ground floor, and standing on an average three feet in water, which communicate with each other by holes bored through the wooden partitions. These stews are covered with trap doors, which, when locked, even the person who inhabits the cottage connected with them, could not open and get at the fish, without the certainty of detection. It is suggested that where noblemen and gentlemen of fortune are

desirous of having a regular supply of fish for their tables, and at the same time of providing a residence for a dependent, this kind of pond fish-house may be beneficially erected. See FISH, and FISH-PONDS.

POND Mud, in *Agriculture*, that sort of earthy vegetable material, which is collected from the depositions of stagnant waters, and becomes an useful manure when mellowed by exposure to the atmosphere, and blended with some sort of dung into a kind of compost. See MUD.

Mr. Young considers June as the proper season for emptying ponds and cleansing rivers, for the sake of the mud; for being early in the summer, there is afterwards an opportunity of turning the mud over, and thereby sweetening it, and laying it into the proper state for bringing on the land. This is a part of husbandry, he says, too much neglected by many farmers; but advantage should always be taken of it by a good husbandman, when he is lucky enough to succeed a great slover; for then he will probably find all the ponds, &c. full of rich mud.

He thinks it is improbable that pond mud, especially if there is a stream into the water, should ever fail of proving a good manure, when judiciously used. The method of managing it which has been found the most beneficial, is the following: as soon as the mud is dry and hard enough to spit, turn it over, and, in about three weeks or a month after, mix it with an equal quantity of chalk or marle: either bring the chalk to the mud, or carry the mud to the chalk. If lime is cheap and plentiful, it will be an excellent management to add about one-fourth the quantity of mud in lime. Let the whole be mixed well together and remain until September, when it should be turned over again, and spread upon pasture or meadow land in October. This is husbandry that will pay well in most cases.

It has been observed by the author of the Middlesex Report, that every pond that can be made by the damming of a stream, would collect large quantities of mud, always fit for immediate application on arable land, without any thing else being mixed with it, or on grass, after being mixed and turned up with dung. Of such great use, says he, are ponds, as collectors of mud, that some excellent farmers have a small one at the lowest corner of every close for the water to deposit the grosser parts of its rich sediment in.

In the county of Essex Corrected Report on Agriculture, Mr. Walford states three experiments which he made with mud upon an upland, laid down with grasses about eight years, the mud from a moat, the bottom of which is a white marly clay. In September 1790 he cast the moat, one end of which adjoins the farm-yard, and had received the draining from it eighteen or nineteen years; this part, he was advised, contrary to his own opinion of its being proper, to cart immediately upon the land, and spread it as soon as it was dry enough: he did so, and the effect was infinite injury to the succeeding crop of grass; it caked down so very firm, that the rain and frost, that season, with the assistance of a great deal of labour, did not pulverize it sufficiently for the grass to get through. The loss he sustained was very considerable, there being less hay than on any other part of the field. The following year he was very much inclined to have harrowed it with a heavy pair of harrows, and sow it again with seeds: he did not, yet he is convinced the crop would have been more productive if he had; for it was very light, and not equal to the crop before the mud was carried on.

The third year, being a wet season, it began to work, and produced him a tolerable burthen, but not sufficient to repay the loss of the two former; yet the benefit was very visible,

for the spot where it was laid might have been traced to great exactness.

The mud from the other parts of the moat was thrown upon the banks and left to drain; this he wished to have let remain there a year, to have stirred it over, and then carried it upon the pasture, but was again prevailed upon to carry on two parts out of three as soon as it was dry enough to cart; being told it would save a considerable expence, and be equally beneficial, in both of which he was disappointed: the extra expence of bush-harrowing, and beating the clods to pieces, was more than the stirring would have been; for, like the former, it caked down, and injured instead of benefiting the succeeding crop of grafs, but not in so great a degree, for he thought some advantage was derived from it the second year.

As the two methods above were quite contrary to his own ideas and opinion, he was determined with the mud that remained to adopt the following plan of his own, which probably may not be new in many other places, although it is in this. Instead of carting the mud when dry, he turned it over with a spade, except about one rod at the end, which, from some cause or other, was neglected till March; he then dug it and planted potatoes. The other part, from having had the winter's frost and rains, was very full of mould, and he imagined would do exceedingly well for carrots; it was sown with carrots; but whether from the dryness of the season, the badness of the seed, or the soil not being proper, the latter he believes, his crop was a very bad one; but the potatoes exceeded his expectations; had the whole been planted with them, the produce would have doubly paid him the expence of digging and planting; and the mud received great benefit, by being stirred over when they were taken up.

When the crops were cleared, he carted the mud upon the poorest part of the pasture, and was agreeably surpris'd to find it produced a very fine crop of grafs the June following, superior to many parts of the field that had been well manured at the same time. The luxuriance of the crop was so conspicuous, as to attract the attention of the neighbouring farmers.

Therefore, having met with such great success from the latter experiment, he shall in future empty his ponds between hay-time and harvest, let the mud lie till it is dry enough to dig, then stir it over, and in March dibble in potatoes; being convinced, if it is not the best method to adopt, it is a profitable one, where the mud is taken from a clay bottom.

At Halstead in the same county, Mr. Vaizey tried the mud from a pond which received no more than the wash of a small field, spreading it on the grafs land fresh, and it was decidedly beneficial; but on arable land he has not observed any benefit from it.

In the Oxford Corrected Agricultural Report, Mr. Hair-bottle, of Henley, is stated to have emptied the mud from a pond communicating with the Thames, and spread it for turnips, but that it did no good whatever.

In Lancashire and some other counties, they find the oozy mud taken from below the sand on the sea-coasts, to be a very useful and beneficial manure on the arable as well as the pasture lands. See MANURE.

POND Weed, in *Botany*. See POTAMOGETON.

POND Weed, *Water*. See PERSICARIA.

POND Weed, *Triple-headed*. See ZANNICHELLIA.

POND Weeds, in *Agriculture*, such weeds as are collected in ponds and rivers, and which are often used as manure. Some ponds and rivers are so full of weeds of this kind that they afford vast quantities of manure. It has been re-

marked that nothing is more surpris'ing than the great negligence which prevails, not only in Essex, but most other places, respecting the river *conserva*, which is very abundant in the streams thereabouts, as well as in most other parts of the kingdom. The Mallendine water, it is said, is full of it, in a thousand varieties; but this admirable manure is left to rot in its element; being noticed only by the millers, who, in order to keep it from clogging their mill-wheels, and to allow the water a free draught, cut it at some feet below the surface, with an instrument made of old scythe blades, loosely rivetted together at their ends, to any desired length: they sink this pliant instrument to a convenient depth, with the edge towards the part they are proceeding to, and dragging it with a swinging motion from side to side, as they walk on each side of the river, cut the weeds; which are then easily taken out by means of long rakes.

These weeds, when landed, are suffered to lie on the banks, where they rot in a very short time, and cause the grafs to grow very rank. From the experiments that have been made with these weeds as a manure, they appear to be particularly eligible, when laid on fresh, for light and warm lands; and as there are in this neighbourhood, as well as most others, many spots of that description, such as fine gravelly loams, lying upon chalk, which bear very fine barley, it is thought the owners of those soils are blind to their interests, when they overlook the opportunity that offers of collecting at least two thousand loads of water weeds, which could be annually drawn from the rivers between Stortford, Mallendine, and Elsingham alone!! These, with an immense quantity of slimy sediment, now forming heavy banks in many parts of those waters, and which might be taken out without any great exertion, it is supposed would tend to produce many a good bushel of corn!!

In almost every part of the country there is much too great a neglect of the collection of pond and river weeds for the purposes of manure. See MANURE and WEEDS.

POND Creek, in *Geography*, a river of Virginia, which runs into the Ohio, N. lat. $38^{\circ} 55'$. W. long. $81^{\circ} 55'$.

POND Creek, or Fern Creek, a river of Kentucky, which runs into the Rolling Fork, N. lat. $37^{\circ} 47'$. W. long. $86^{\circ} 16'$.

PONDA, a town of Hindoostan, in the country of Soonda; 13 miles S.E. of Goa. N. lat. $15^{\circ} 23'$. W. long. $73^{\circ} 56'$.

PONDERATE, in our *Ancient Customs*, a method of curing sick children, by weighing them at the tomb of some faint; counterpoising or balancing the scale with money, wheat-bread, or any other thing that parents were willing to offer to God, his faints, or the church.

But a sum of money was always to make part of the counterbalance. By this means the cure was effected. "Ad sepulchrum sancti, nummo se ponderabat."

PONDICHERY, in *Geography*, a town of Hindoostan, in the Carnatic, on the coast of Coromandel, at the mouth of the river Gingee. It was first settled by the French, who obtained a grant of it, in 1674, from a rajah of Gingee, who acknowledged the king of Narlinga as his superior. This grant was confirmed by Sevagee, who took possession of Gingee about the year 1677. In the year 1693 it was taken by the Dutch, who erected walls and bastions, and made every other addition which was necessary to render it one of the most complete fortresses in the Indies. In 1696 it was restored to the French for the sum of 5000*l.*, and then it became the chief residence of the French East India Company. Previous to the war

of 1756, Pondicherry was, perhaps, the finest city in India. It extended along the sea-coast about $1\frac{1}{4}$ mile, and was about $\frac{3}{4}$ of a mile in breadth; it was well built according to the fashion of the country; and had a citadel, then the best of its kind in India, but of too contracted dimensions. Although its situation within the torrid zone renders it very hot, its situation is not infalubrious. It has no rain, except for seven or eight days, towards the end of October. The native Indians, or Gentoos, who inhabit it, are mostly weavers or painters; and though their earnings are small, they are enabled to subsist; their chief food being rice boiled in water, or formed into a paste, which is baked upon the coals. The adjacent district is well cultivated, and produces abundance of rice, nor is there hardly a place in India, where fish, flesh, and fowl may be procured on more reasonable terms. Its want of a port is a great inconvenience; nor can ships approach the coast nearer than about half a league, and this they do with difficulty and danger. This fine city was first taken by the English in 1761, and was immediately razed to the ground, in retaliation of M. Lally's conduct towards the fortifications and buildings of Fort St. David in 1758. In the year 1763 it was restored to the French by the peace of Versailles, and orders were given for repairing the fortifications. In 1778 it was again taken by the English, and restored in 1783. In 1793 it was again taken by the British. It lies S. of Madras 100 road miles. N. lat. $11^{\circ} 56'$. E. long. $79^{\circ} 55' 40''$.

PONDICO, a small uninhabited island in the Grecian Archipelago; two miles N. of Negropont. N. lat. $39^{\circ} 10'$. E. long. $23^{\circ} 29'$.

PONDIL, a town of Hindoostan, in Bahar; 37 miles S.S.W. of Patna.

PONDIMARKA, a town of Hindoostan, in the circar of Cicacole; 20 miles S.W. of Visigapatam.

PONDONG, a small island in the East Indian sea, near the S.E. coast of Siao. N. lat. $2^{\circ} 40'$. E. long. $125^{\circ} 10'$.

PONDURO, a town of Peru, in the diocese of La Paz; 28 miles N. of Oruro.

PONDUS, WEIGHT. See WEIGHT.

PONDUS, in *Ancient Records*, denotes a duty paid to the king, according to the weight of merchandizes.

PONDUS Regis, the standard weight anciently appointed by the king; being that which we now call *troy weight*. See STANDARD and TROY WEIGHT.

Ad PONDUS Omnium. See AD.

PONDUS, *Temperamentum ad*. See TEMPERAMENTUM.

PONDY, in *Geography*, a small island in the East Indian sea, near the E. coast of Madura. S. lat. $6^{\circ} 57'$. E. long. $114^{\circ} 23'$.

PONE, in *Law*, a writ, whereby a cause depending in the county, or other inferior court, is removed to the common pleas, or sometimes to the king's bench.

PONE *per vadium, et salvos plegios*, is a writ, issuing out of the court of common pleas, commanding the sheriff to take surety or gage of one for his appearance at a day assigned. This is also called a writ of *attachment*.

PONENDIS in *Affisis*, a writ granted by the statute of Westmin. 2. cap. 38. which statute shews what persons sheriffs ought to impanel upon assises and juries, and what not.

PONENDUM in *Ballium*, a writ commanding that a prisoner be *bailed*, in cases bailable.

PONENDUM *sigillum ad exceptionem*, a writ by which justices are required to put their seals to *exceptions* exhibited by the defendant against the plaintiff's evidence, verdict, or

other proceedings before them, according to stat. Westmin. 2.

PONFERRADA, in *Geography*, a town of Spain, in the province of Leon; 23 miles of Astorga.

PONGA, in *Botany*, H. M. *Jaca minor sylvestris Malabarica*. D. *Commelin tatarisbe Brasiliensium Pison. similis*; a tall evergreen tree growing in Malabar, and bearing no observable flowers; the fruit adheres to the branches in the same manner as that of the jaca; and hence the Portuguese call the tree the wild jaca; the calyces are echinated, the first green, and afterward reddish, and contain multitudes of roundish, oblong, acuminate, and reddish seeds.

A cataplasm prepared of the green fruit of the tree bruised, being applied to tumours, promotes their suppuration. Of the bark and root, boiled in water, is prepared a fomentation for œdematous tumours of the legs; an endemic disease among the Indians, and called by the Portuguese *pædo St. Thomæ*, which preserves them from an inflammation. Raii H. P.

PONGALLAH, in *Geography*, a town of Hindoostan, in Palnaud, on the right bank of the Kistnah; 20 miles N.E. of Timerycotta.

PONGATIUM, in *Botany*, altered from the barbarous Pongati of the Hortus Malabaricus, Juss. 423. See SPHENOCLEA and RAPINIA.

PONG-HOU, or PISCADORES, in *Geography*, a cluster of small islands, or rocks, as M. de la Perouse calls them, in the channel of Formosa, about six leagues from the W. coast of that island. This navigator represents them as appearing in all kinds of shapes; and five of them, of a moderate height, formed like Sandy downs, without any trees upon them. These islands were known to the Dutch, when they were masters of Formosa, who are said to have fortified the port of Pong-hou; and it is known, that the Chinese maintain here a garrison of 5 or 600 Tartars, who are relieved annually. N. lat. $23^{\circ} 30'$.

PONGO, in *Zoology*, a name given in Purchas's Pilgrims and also by Buffon to the *orang-outang*; which see. See also SIMIA *Satyrus*.

PONI, in *Geography*, a river of Hindoostan, which runs into the Palia, five miles W. of Arcot.

PONIARD, formed from the French *poignard*, and that from *poignée, handful*, a little pointed dagger, very sharp-edged; borne in the hand, or at the girdle, or hid in the pocket.

The poniard was anciently in very great use; but is now in good measure set aside, except among assassins.

Sword and poniard were the ancient arms of duellists; and are said to continue still so among the Spaniards.

The practice of sword and poniard still makes a part of the exercise taught by the masters of defence.

PONIENUNAY, in *Geography*, a town of Samogitia; 28 miles E.S.E. of Birza.

PONIEWICZ, a town of Samogitia; 30 miles E.N.E. of Rosienne.

PONLAPILLY, a town of Hindoostan, in Golconda; 30 miles S.S.W. of Hydrabad.

PONO, a town on the S.W. coast of the island of Sumatra. S. lat. $4^{\circ} 21'$. E. long. $102^{\circ} 42'$.

PONOI, a town of Russia, in the government of Archangel, on the coast of the Frozen ocean; 144 miles N. of Archangel.—Also, a river of Russia, which runs into the Frozen ocean, near the town of its name. N. lat. $67^{\circ} 10'$. E. long. $40^{\circ} 44'$.

PONOMPING, a town of the kingdom of Cambodia; 20 miles S.E. of Cambodia.

PONORTZIC,

PONORTZIC, a town of Lithuania, in the palatinate of Troki; 20 miles N.W. of Troki.

PONPON. See EDISTO, in which article read PONPON.

PONS, a town of France, in the department of the Lower Charente, and chief place of a canton, in the district of Saintes. The place contains 4500, and the canton 15,350 inhabitants, on a territory of 250 kilometres, in 20 communes.—Also, a town of Spain, in Catalonia; 14 miles N. of Cervera.

PONS, *St.*, a town of France, and principal place of a district, in the department of the Herault. The town contains 4506, and the canton 8012 inhabitants, on a territory of 225 kilometres, in six communes.

PONS *Varolii*, in *Anatomy*, a part of the medulla oblongata. See BRAIN.

PONSAH, in *Geography*, a town of Hindoostan, in Bahar, at the union of the Coyle with the Soane; seven miles S. of Rotasgur. N. lat. $24^{\circ} 31'$. E. long. $84^{\circ} 1'$.

PONT, a river of England, in the county of Northumberland, which runs into the German ocean; seven miles N. of Tinemouth.

PONT *l'Abbé*, a town of France; in the department of Finisterre, and chief place of a canton, in the district of Quimper; nine miles S.S.W. of Quimper. The place contains 1895, and the canton 11,092 inhabitants, on a territory of $247\frac{1}{2}$ kilometres, in 11 communes.

PONT *d'Ain*, a town of France, in the department of the Ain, and chief place of a canton, in the district of Bourg, near the river Ain. The place contains 1089, and the canton 9099 inhabitants, on a territory of 205 kilometres, in 12 communes.

PONT *sur Allier*, a town of France, in the department of the Puy de Dôme, and chief place of a canton, in the district of Clermont. The place contains 3032, and the canton 10,110 inhabitants, on a territory of $87\frac{1}{2}$ kilometres, in six communes.

PONT *de l'Arche*, a town of France, in the department of the Eure, and chief place of a canton, in the district of Louviers; six miles N. of Louviers. The place contains 1462, and the canton 11,292 inhabitants, on a territory of 180 kilometres, in 20 communes.

PONT *Beauvoisin*, a town of France, in the department of Mont Blanc, and chief place of a canton, in the district of Chambéry. The place contains 1200, and the canton 6582 inhabitants, on a territory of $77\frac{1}{2}$ kilometres, in ten communes.—Also, a town of France, in the department of the Isere, and chief place of a canton, in the district of La Tour-du-Pin; separated by a small river from Savoy; 11 miles W. of Chambéry. The place contains 1482, and the canton 13,966 inhabitants, on a territory of $147\frac{1}{2}$ kilometres, in 15 communes.

PONT *de Camarez*, a town of France, in the department of the Aveyron, famous for its mineral waters; 18 miles S. of Millau.

PONT *de Cé*, a town of France, in the department of the Maine and Loire, and chief place of a canton, in the district of Angers; three miles from Angers. The place contains 3018, and the canton 18,393 inhabitants, on a territory of 180 kilometres, in 17 communes.

PONT *Chartrain*, a lake of West Florida, 60 miles in circumference, near New Orleans. N. lat. $30^{\circ} 13'$. W. long. 90° .—Also, an island in lake Superior, S.W. of Maurepas island.

PONT *Chateau*, a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Savenay; 13 miles W. of Blain. The place con-

tains 2572, and the canton 6964 inhabitants, on a territory of $142\frac{1}{2}$ kilometres, in five communes.

PONT *Croix*, a town of France, in the department of Finisterre, and chief place of a canton, in the district of Quimper; 15 miles W. of Quimper. The place contains 1355, and the canton 13,071 inhabitants, on a territory of $157\frac{1}{2}$ kilometres, in 11 communes. N. lat. $48^{\circ} 2'$. W. long. $4^{\circ} 27'$.

PONT *l'Evêque*, a town of France, and principal place of a district, in the department of the Calvados; 21 miles E. of Caen. The place contains 2500, and the canton 13,047 inhabitants, on a territory of $157\frac{1}{2}$ kilometres, in 27 communes. N. lat. $49^{\circ} 17'$. E. long. $0^{\circ} 16'$.

PONT *Gibaud*, a town of France, in the department of the Puy de Dôme, and chief place of a canton, in the district of Riom; 10 miles W.S.W. of Riom. The place contains 624, and the canton 8603 inhabitants, on a territory of $277\frac{1}{2}$ kilometres, in nine communes.

PONT-*a-Marcq*, a town of France, in the department of the North, and chief place of a canton, in the district of Lille. The place contains 406, and the canton 13,150 inhabitants, on a territory of $112\frac{1}{2}$ kilometres, in 15 communes.

PONT *de Montvert*, a town of France, in the department of the Lozere, and chief place of a canton, in the district of Florac; seven miles E. of Florac. The place contains 1938, and the canton 4602 inhabitants, on a territory of $222\frac{1}{2}$ kilometres, in six communes.

PONT-*e-Mousson*, a town of France, in the department of the Meurthe, and chief place of a canton, in the district of Nancy, situated on the Moselle, and divided by it into two parts. Charles IV. in 1354 made it imperial, and it had formerly an university, which in 1768 was removed to Nancy; 13 miles N.N.W. of Nancy. The town contains 6767, and the canton 14,384 inhabitants, on a territory of $157\frac{1}{2}$ kilometres, in 21 communes. N. lat. $48^{\circ} 54'$. E. long. $6^{\circ} 8'$.

PONT *de Remy*, a town of France, in the department of the Somme; six miles E.S.E. of Abbeville.

PONT-*en-Royans*, a town of France, in the department of the Isere, and chief place of a canton, in the district of Saint Marcellin; six miles S. of it. The place contains 1081, and the canton 7704 inhabitants, on a territory of 210 kilometres, in 13 communes.

PONT *Saint Esprit*, a town of France, in the department of the Gard, and chief place of a canton, in the district of Uzes, seated on the Rhone, and defended by a citadel. The place contains 4845, and the canton 11,278 inhabitants, on a territory of 240 kilometres, in 16 communes; 28 miles N.N.E. of Nîmes. N. lat. $44^{\circ} 16'$. E. long. $4^{\circ} 43'$.

PONT *Ste. Maxence*, a town of France, in the department of the Oise, with a bridge over the river Oise, and chief place of a canton, in the district of Senlis; six miles N. of Senlis. The place contains 2660, and the canton 9769 inhabitants, on a territory of 120 kilometres, in 17 communes.

PONT *St. Pierre*, a town of France, in the department of the Eure; six miles N.E. of Pont de l'Arche.

PONT *de Salars*, a town of France, in the department of the Aveyron, and chief place of a canton, in the district of Rhodes. The place contains 235, and the canton 6247 inhabitants, on a territory of 300 kilometres, in 14 communes.

PONT *sur Sambre*, a town of France, in the department of the North; seven miles E. of Le Quesnay.

PONT *St. Vincent*, a town of France, in the department of Meurthe; six miles S. of Nancy.

PONT-*Scorff-Lesbein*, a town of France, in the department of the Morbihan, and chief place of a canton, in the district of L'Orient; six miles N.W. of Hennebon. The place contains 1721, and the canton 12,909 inhabitants, on a territory of 197½ kilometres, in six communes.

PONT *sur Seine*, a town of France, in the department of the Aube; four miles N.E. of Nogent sur Seine.

PONT *de Sorques*, a town of France, in the department of the Mouths of the Rhone; six miles N. of Avignon.

PONT *Valain*, a town of France, in the department of the Sarthe, and chief place of a canton, in the district of La Flèche; 10 miles E.N.E. of La Flèche.

PONT *sur Vannes*, a town of France, in the department of the Yonne; six miles E.S.E. of Sens.

PONT *de Vaux*, a town of France, in the department of the Ain, and chief place of a canton, in the district of Bourg, near the union of the Rehouse with the Saone; 37 miles N. of Lyons. The place contains 2806, and the canton 12,881 inhabitants, on a territory of 142½ kilometres, in 11 communes. N. lat. 46° 26'. E. long. 5° 1'.

PONT *de Vesle* or *Vesle*, a town of France, in the department of the Ain, and chief place of a canton, in the district of Bourg; 15 miles W. of Bourg. The place contains 1426, and the canton 8474 inhabitants, on a territory of 140 kilometres, in 12 communes. N. lat. 46° 16'. E. long. 4° 58'.

PONT *le Voye*, a town of France, in the department of the Loire and Cher; nine miles S. of Blois.

PONT *sur Yonne*, a town of France, in the department of the Yonne, and chief place of a canton, in the district of Sens; six miles N.N.W. of Sens. The place contains 1442, and the canton 9419 inhabitants, on a territory of 202½ kilometres, in 23 communes.

PONTA, in *Biography*, a Bohemian performer on the chromatic French horn, whose taste and extraordinary execution were extremely applauded in London, particularly at the Pantheon, before that beautiful building was destroyed by fire.

PONTA-*Delgada*, in *Geography*, a sea-port town of St. Michael, one of the Azores, defended by a citadel, containing three parish churches, seven convents, and about 8000 inhabitants.

PONTA *do Sal*, a small town in the island of Madeira.

PONTAC, or PONTIAC, a town of France, in the department of the Lower Pyrenées, and chief place of a canton, in the district of Pau; 13 miles S.E. of Pau. The place contains 2400, and the canton 7780 inhabitants, on a territory of 117½ kilometres, in 12 communes.

PONTADURA, a small island in the Adriatic, with a town, S.W. of Pago. N. lat. 44° 33'.

PONTAFELLA, a town of Upper Carinthia; 16 miles S.W. of Villach.

PONTAGE, PONTAGIUM, a contribution towards the maintenance, repairing, and rebuilding of bridges. See BRIDGE.

This was anciently one of the three general national charges, from which no person of any degree whatever was exempted.

The three things called *trinoda necessitas*, whence Ingulphus tells us, *nulli possunt laxari*, were, the expedition to the wars, the building of castles, and the building and repairing of bridges. Mr. Selden, in his notes on Eadmerus, observes, that *ne quidem episcopi, abbates, & monachi, immunes erant*. And Matt. Paris adds, anno 1244, that in all grants of privileges to the monasteries, those three things

were always excepted, for the public good, and that the people might be better able to resist an enemy.

PONTAGE is also a due anciently belonging to the lord of the fee, for persons or merchandizes, that pass over rivers, bridges, &c. called in the later Latin *pontagium*, or *pontoniagium*, pontage.

PONTAGIA, a term used by Paracelsus, and his followers, to express a mixing saline substances with those which are bitter or styptic.

PONTAILLER *sur Saone*, in *Geography*, a town of France, in the department of the Côte-d'Or, and chief place of a canton, in the district of Auxonne. The place contains 1270, and the canton 10,631 inhabitants, on a territory of 202½ kilometres, in 20 communes.

PONTANO, GIOVANNI, in the Latin language Jovianus Pontanus, in *Biography*, one of the most distinguished Latinists of Italy, was born in 1426, at Cereto, in the diocese of Spoleto. He was educated at his native place, and at Perugia. For a time he quitted the pursuits of literature, and adopted a military life. He served under king Alphonso during the war with the Florentines, and in 1447 accompanied that prince to Naples, where he renewed his literary pursuits under Antonio Panormitano. After this he was entrusted by Ferdinand I. with the education of his son Alphonso, and procured for him a wealthy marriage. On the death of Panormita, Pontano succeeded him as secretary to Ferdinand, in which capacity he afterwards served two other kings, *viz.* Alfonso II. and Ferdinand II. He attended these princes in all their journeys and military campaigns, and was treated by them with great respect. In 1486 he was sent ambassador by Ferdinand I. to pope Innocent VIII. for the purpose of negotiating a peace; on which occasion he received singular tokens of the pontiff's esteem. He was much mortified at the disappointment of his high expectations of promotion through the influence of his pupil, prince Alfonso, and wrote a satirical dialogue, entitled "Asinus," in which he complained of royal ingratitude without reserve. He died in 1503, at the age of 77. His morals were infected with the licentiousness of the times; but he stands high as a promoter and encourager of literature. He augmented and firmly established the academy of Naples, which had been founded by Panormitano, and of which Pontano was, for a considerable time, at the head, and it is thought that he changed his name from John to Jovian, as an academician, and his example was followed by other members of that learned body. His reputation is chiefly founded on his character as a poet. He is reckoned among the first who revived the elegance, grace, and harmony of the best Latin poets. His compositions are numerous, and on various subjects, comprehending didactic pieces, eclogues, hymns, amorous verses, inscriptions, epigrams, &c. Of all his pieces, the most considerable is entitled "Urania," an astronomical work in five books, which is said to display great erudition. He wrote on the culture of oranges, on moral philosophy, and on various philological subjects. In the department of history, he wrote six books "On the Wars between Ferdinand I. of Naples, and John Duke of Anjou." His style is pure and elegant, but often obscure. The poems of Pontanus were printed in an octavo volume, by Aldus, in 1505 and 1533. All his works were published collectively in 4 vols. 8vo.

PONTANUS, JOHN ISAAC, an historian and writer on philosophy, was born, in 1571, at Helsingor, in Denmark, of parents from Haarlem, in Holland. He was brought up to the study of physic at Basil, where he took his degrees, but it does not appear that he practised it. He preferred general science to a particular branch of it, and became

became professor of philosophy and mathematics at Har-
derwick, and was nominated historiographer to the king of
Denmark, and the province of Gueldres. He died in the
year 1640. His principal works are, "Itinerarium Gallie
Narbonensis;" "Historia Urbis et Rerum Amsteloda-
mensium;" "Origines Rerum Franciscarum;" "Rerum
Danicarum Historia;" "Historia Geldrica." Moreri.

PONTANUS, JAMES, a learned Jesuit of Bohemia, was
born at Brugg in 1542. At the age of 21 he entered
the society of Jesuits, and was employed for a considerable
time as a teacher of the classics. He obtained a high re-
putation by several grammatical and philological publica-
tions. He died at Augsburg in 1626, at the age of 84.
His principal works are, "Institutiones Poeticæ;" "Com-
mentaries on Virgil and Ovid;" and translations of several
of the Byzantine historians, and of some Greek theological
writers.

PONTANUS, PETER, a grammarian of Bruges, who was
blind from three years of age, but who, by his talents and
indefatigable industry, acquired a great reputation as a
teacher of the belles lettres at Paris. He is author of
treatises on rhetoric and versification. The exact times
of his birth and death are not known; but he flourished
at the beginning of the 16th century.

PONTARION, in *Geography*, a town of France, in the
department of the Creuse, and chief place of a canton, in
the district of Bourgueuf. The place contains 289, and
the canton 6936 inhabitants, on a territory of 205 kilio-
metres, in 10 communes.

PONTARLIER, a town of France, and principal place
of a district, in the department of the Doubs, on the borders
of Switzerland, defended by a castle about half a mile from
the town. The place contains 3880, and the canton 12,116
inhabitants, on a territory of 337½ kilometres, in 26 com-
munes. N. lat. 46° 54'. E. long. 6° 25'.

PONTAUEMÉR, a town of France, and principal
place of a district, in the department of the Eure. The
place contains 5090, and the canton 13,631 inhabitants, on
a territory of 120 kilometres, in 18 communes. N. lat.
49° 21'. E. long. 0° 37'.

PONTAVEN, a town of France, in the department
of Finisterre, and chief place of a canton, in the district
of Quimperlé; 7 miles W. of Quimperlé. The place contains
760, and the canton 10,913 inhabitants, on a territory of
152½ kilometres, in five communes.

PONTAUMUR, a town of France, in the department
of the Puy-de-Dôme, and chief place of a canton, in the
district of Riom; 12 miles W.N.W. of Clermont. The
place contains 1160, and the canton 10,981 inhabitants,
on a territory of 355 kilometres, in 15 communes.

PONTDAROÏDE, a town of France, in the depart-
ment of Finisterre, and chief place of a canton, in the
district of St. Hippolyte. The place contains 440, and the
canton 5472 inhabitants, on a territory of 190 kilometres,
in 25 communes.

PONTE, GIACOMO DA, in *Biography*. See BASSAN.

PONTE, in *Geography*, a town of France, in the depart-
ment of the Dora, at the conflux of the Soana and
Orco; 19 miles N.N.W. of Turin.—ALFO, a town of
Portugal, in the province of Beira; 4 miles S. of Mon-
temor o Velho.

PONTE de Barca, a town of Portugal, in the province of
Entré Duero e Minho; 9 miles N. of Braga.

PONTE de Brenta, a town of Italy, in the Paduan; 5
miles N.N.E. of Padua.

PONTE-Centefimo, a town of Italy, in the duchy of Spoleto,
on the Topino; 5 miles S. of Nocera.

PONTE-Corvo, a town of Naples, in Lavora; 34 miles
N.W. of Capua.

PONTE-Decimo, a town of the Ligurian Republic; 8
miles N.N.W. of Genoa.

PONTE-Landelfo, a town of Naples, in Principato Ultra;
11 miles N. of Benevento.

PONTE-de-Lima, a town of Portugal, in the province of
Entre Duero e Minho, on the Lima, containing a colligate
church, three hospitals, two convents, and about 2000 in-
habitants; 12 miles N.E. of Braga. N. lat. 41° 44'.
W. long. 8° 15'.

PONTE-Molino, a town of Italy, in the Veronese; 24
miles S. of Verona.

PONTE-Nura, a town of Italy; 7 miles S.E. of Pia-
cenza.

PONTE de Olivença, a town of Spain, in Estramadura;
7 miles N.W. of Olivença.

PONTE de St. Mauro, a town of Goritz; 7 miles N. of
Goritz.

PONTE de St. Nicolo, a town of Italy, in the Paduan;
3 miles E.S.E. of Padua.

PONTE de Soro, a town of Portugal, in Estramadura; 15
miles S.S.E. of Abrantes.

PONTE Stura, a town of France, in the department of the
Marengo, at the conflux of the Stura and Po; 4 miles
W. of Casal.

PONTEAMASS, a town of Cambodia, near the
mouth of a river which runs into the gulf of Siam. N. lat.
10° 30'. E. long. 104°.

PONTEBA, or *Ponte Imperiale*, a town of the
duchy of Carinthia, separated by a small river from Pon-
teba Veneta.

PONTEBA Veneta, a town of Italy, in the county of Friuli,
belonging to Carinthia; 28 miles N.N.W. of Friuli.

PONTEDERIA, in *Botany*, so named by Linnæus,
after Julius Pontedera, professor of botany at Padua, who
published a quarto work called *Anthologia*, and wrote
against the sexes of plants. His last-mentioned treatise did
not see the light till its author was no more, when its whole
importance arose from the celebrity of the subject, and the
firm establishment of the doctrine it was designed to refute.
—Linn. Gen. 159. Schreb. 214. Willd. Sp. Pl. v. 2. 22.
Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 206.
Juss. 55. Lamarek Illust. t. 225. (*Michelia*; Rel.
Houft. 8.)—Class and order, *Hexandria Monogynia*. Nat.
Ord. *Enfate*, Linn. *Narcissus quodammodo affinis*, Juss.

Gen. Ch. *Cal.* Common sheath oblong, bursting at
the side. *Cor.* of one petal, tubular, in two deep divisions;
the upper lip external, straight, in three deep equal seg-
ments; lower reflexed, in three deep equal segments.
Stam. Filaments six, inserted into the corolla, three
of them, which are longest and awl-shaped, into the
mouth, the rest into the base, of the tube; anthers
erect, oblong. *Pist.* Germen superior, oblong; style simple
declining; stigma swelling. *Peric.* Capsule fleshy, con-
ical, with a broad inflexed point, triangular, with three
furrows, and three cells. *Seeds* numerous, roundish.

Ess. Ch. Corolla of one petal, two-lipped, in six seg-
ments. Three of the stamens inserted towards the top of
the tube. Capsule superior, of three cells.

A handsome genus of aquatic, perennial, fibrous-
rooted, herbaceous plants. Linnæus has only three species
in his Sp. Pl., Willdenow has six. The two following are
known in our gardens.

P. cordata. Heart-leaved Pontederia. Linn. Sp. Pl.
412. Willd. n. 5. Trew Ehret 45. t. 83. Redout.
Liliac. t. 72. Curt. Mag. t. 1156.—Leaves heart-shaped.

Flowers

Flowers spiked.—Native of pools in Virginia, introduced by Peter Collinson, before the year 1751. It is hardy in ponds or water-troughs, flowering in July and August. The stem rises a foot or two above the water, bearing several alternate, heart-shaped, entire, smooth leaves, on long, spongy, sheathing stalks. Flowers numerous, of a brilliant full sky blue, composing a spike three or four inches in length.

P. dilatata. Dilated Pontederia. Buchanan in Symes's Voyage to Ava, 475, with a plate. Andr. Repof. t. 490. Ait. n. 2.—Leaves heart-shaped. Flowers in an umbel-shaped corymbus.—Native of the East Indies. Cultivated by Mr. William Anderson in 1806, in the stove of James Vere, esq., where it flowered in May. The leaves are more acute than in the foregoing, and the flowers much larger, disposed in a corymbose or umbellate tuft, overtopped by a leaf. This species is not included among those of Willdenow. The *hastata* of Linnæus, figured in Roxb. Coromand. v. 2. t. 111, is assuredly different.

PONTEE, in the *Glass Trade*, an iron instrument used to stick the glass at the bottom, for the more convenient fashioning the neck of it.

PONTEFRAC, or POMFRET, in *Geography*, is a borough, market-town, and parish, in the wapentake of Osgoldcross, West-Riding of Yorkshire, England. The town stands on the summit of an eminence, at the distance of 26 miles S.S.W. from York, and 178 miles N.N.W. from London. It is described to be of great antiquity; but the precise era of its origin is unknown. Leland and Drake ascribe its foundation to the Romans, and Camden and others to the Saxons. It was certainly a burgh in the time of Edward the Confessor, and at the Conquest a castle was built here by Ilbert de Lacy, to whom king William gave the manor soon after he had established himself on the English throne. Since that period, Pontefract and its castle have been the scenes of several events of great interest and importance in the general history of the kingdom. In the reign of Edward II., when its castle was the property of the rebellious Thomas, earl of Lancaster, it was besieged by the king, and surrendered to him at the first summons, the earl having previously marched northward. After the battle of Borough-bridge, in which Lancaster was taken prisoner, he was brought to Pontefract, and imprisoned in one of the towers of the castle till the day of his execution. On the same day many other noblemen and knights, his adherents, suffered here, and several also at York. King Richard II. was confined, and eventually murdered within the walls of this castle; and in the succeeding reign it was the prison and place of condemnation of Richard Scroope, archbishop of York, who was executed near Bishopthorpe on the 8th of June, A. D. 1405. In this castle, likewise, Anthony Woodville, earl Rivers, Richard lord Grey, sir Thomas Vaughan, and sir Richard Hawse, were put to death, without even the form of a trial, by command of Richard III. The next event of political moment which occurred here, was the surrender of the castle to Robert Aske, and the papal rebels, in the reign of Henry VIII.; from which time nothing again occurred till the period of the grand rebellion in the 17th century. At the commencement of that contest between the king and the parliament, the castle was garrisoned by a brave band of loyalists under colonel Lowther. It was first besieged, in 1644, by sir Thomax Fairfax, who used every effort to obtain possession of it, but without success, and was at length defeated under its walls by sir Marmaduke Langdale, who made a rapid march from Oxford for its relief. The second siege happened in the year following, when, after three months of

incessant cannonades, attacks, and forties, the garrison, being reduced nearly to a state of famine, surrendered the castle upon honourable terms. Sir William Fairfax was then appointed governor for the parliament; but as he found sufficient employment in pursuing the scattered forces of the king, he left the immediate command of it to colonel Coterel, as deputy governor. Towards the conclusion of the war, the garrison of this fortress having been reduced to about a hundred men, from an idea that the weakness of the royal party precluded the fear of an attack, a plan was formed by some of the king's friends to retake it. This plan was accordingly put into execution on the 6th of June 1648, and proved successful. The dispersed loyalists in the county now flocked to the castle, and in a short time it had a complete garrison for its defence. Cromwell besieged it in the month of October succeeding its seizure, and lay before it a month, when, finding it necessary to join the grand army under Fairfax, the command of the besieging army was confided to general Lambert. This able officer raised many new works, made regular approaches, and pushed the siege with all the vigour imaginable; but was, notwithstanding, unable to take it till the 25th of March 1649, when all hope of deliverance having vanished, and the garrison having dwindled away to few more than a hundred men, it was surrendered by capitulation; and about two months afterwards was unroofed and dismantled under the authority of an act of parliament. The castle, seated on an eminence, was formerly of great extent. It consisted of several towers, with intervening walls, and other buildings. The chief ballium was flanked by seven towers; called the round or keep tower; the red tower; the treasurer's, or pix tower; Swellington tower; queen's tower; king's tower; and conitable's tower: a chapel and a magazine were also included in the principal ballium; the latter is cut out of the solid rock, as is also a contiguous dungeon.

In tracing the etymology of Pontefract, topographers have entered into frivolous dissertations, without developing any useful information.

Camden says it was at first denominated Kirkby, and that it obtained the name of Pontefract from the destruction of an old bridge over a marshy place, near to which the town principally stood; and Leland observes, that "the ruins of such a bridge yet its scene scant half a mile east of old Pontefract, but I cannot justly say that this bridge stood full on Watheling-streete." That there was a bridge somewhere close to Pontefract, is corroborated by an inquisition taken in the reign of Edward II., from which it appears that one John Bubwith held the eighteenth part of a knight's fee "juxta veterem Pontem de Pontefract."

The first Norman possessor of Pontefract was Ilbert de Lacy, who received from the Conqueror the gift of upwards of a hundred manors. This nobleman had confirmation from William Rufus of all the customs belonging to his newly erected castle and honour of Pontefract; and, dying shortly after the accession of that monarch, left his vast estates to his son Robert, commonly called de Pontefract, from the circumstance of his having been a native of the town. He, imprudently joining with Robert, duke of Normandy, against Henry I., was banished from the kingdom, when his castle and estates were given to Henry Travers, and afterwards to Henry Delaval. Robert, however, seems to have been restored to his honours and property before the conclusion of Henry's reign. He was succeeded at his death by his eldest son Ilbert, who distinguished himself greatly in the war against the Scots, which terminated in the captivity of their king,

king, David. Ilbert having no children, his estates devolved to his brother Henry, the founder of the once magnificent abbey of Kirkstall, near Leeds. This great baron received from Henry II. the confirmation of his whole honour of Pontefract, with a charter for an annual fair. His successor, Robert de Lacy, was among the barons who attended the coronation of Richard I.; and as he died without issue, Pontefract and his other domains fell to his sister, by his mother's side, Awbrey de Lifours, who, having been likewise the inheritrix of her father's vast possessions, was one of the richest individuals in the kingdom. She married Richard Fitz-Eustace, constable of Chester, and baron of Halton; but her husband did not live to enjoy the estates of the Lacys. Neither did his successor, John, who accompanied king Richard I. to the Holy Land, where he died, leaving his honours and estates to his son Roger, who signalized himself by his courage and conduct at the memorable siege of Acre; and after his return to England assumed the name of Lacy, in consequence of his being put in possession of all the lands belonging to Pontefract, by agreement with his grandmother Awbrey. This Roger granted a charter to the burgesses of Pontefract, which was confirmed by Henry de Lacy, the last and greatest man of his line. He was the confidential friend of Edward I., and accompanied him in his campaigns both in France and Scotland. He obtained for Pontefract the privilege of a market, and died 5th Feb. 1310, when his estates devolved to Thomas earl of Lancaster, in right of his wife Alice, Henry's only daughter and heiress. From this period Pontefract followed the fate of the honour and duchy of Lancaster, and became vested in the crown by the accession of Henry VII.

Pontefract was first constituted a corporate borough by charter in the reign of Richard III. This deed has since been confirmed by different subsequent charters, and the town is now, in virtue of these, governed by a mayor, recorder, and twelve aldermen, all of whom are in the commission of the peace. When this borough began to send members to parliament does not appear; but it has now the privilege of being represented by two members. The elective franchise "is in persons having, within the said borough, a freehold of burgage tenure, paying a burgage rent." The number of voters is estimated at 330. The mayor is the returning officer. The market day here is Saturday; and there are, besides, several annual fairs.

The buildings of this town are chiefly disposed in three long streets, in the form of the letter Y. According to the parliamentary returns of 1811, the houses of Pontefract borough and township amount to 840, and the inhabitants to 3605 in number. Here were anciently two churches, one dedicated to All-Saints, and the other to St. Mary. The former is now a ruin, having been much damaged during the civil wars. From its present remains it has evidently been a large structure. It was built in the form of a cross, with a tower in the centre, which is still entire. St. Mary's, now called St. Giles's, is the parish church. It is of equal, or probably of greater antiquity than the church of All-Saints, but has been completely modernized by additions and repairs.

Pontefract formerly contained several religious establishments. Within the castle was a chantry chapel, or church of St. Thomas, founded in 1361, in memory of Thomas earl of Lancaster. No part of this chapel now exists, but its site may still be traced. Here was also a chapel dedicated to St. Clement. On the plot of ground called Monkhill, stood the priory of St. John, now entirely demolished. It was founded by Robert de Lacy in 1090, and filled with

Cluniac monks. The Dominican friars had a house here; as had likewise the Carmelite, or White friars, and the Augustine friars; but the buildings of all of them are destroyed. St. Nicholas hospital, founded about the time of the Conquest, is still in existence, having been rebuilt during the 17th century. Knolles, or Trinity hospital, is also standing, and constitutes a comfortable asylum for fifteen aged persons. Bead-house hospital supports sixteen poor people; Thwaites's hospital, four; Frank's hospital, two; Cowper's, or Butt's hospital, three; Perfect's hospital, six; and Watkinson's hospital, eight: Frank's hospital was built on the site of a lazaret, founded by Henry de Lacy.

The other charitable institutions in this town are the King's free grammar-school, which was erected and endowed by king Edward VI. for the education of fourteen boys; and a charity-school, in which a limited number of poor children are clothed and educated. The annual revenue of this school in land is 104*l.* 19*s.*; but this sum is much augmented by annual subscription. In the centre of Pontefract formerly stood a cross dedicated to St. Oswald, which was removed in 1734, when the present market-house was erected in its stead by Mrs. Elizabeth Dupier, in compliance with the directions of her husband. Near this building is the town-hall, a modern edifice, erected at the joint expence of the corporation, and of the county. The basement story is appropriated as a prison; and the upper one is occupied by a court-room and offices. In this hall are held the quarter-sessions for the wapentake of Osgoldcross, and also the mayor's court. Here is likewise transacted all the corporation business.

The chief public amusements of Pontefract are the theatre, and the races. The theatre is a neat building, erected a few years ago by subscription, and is open twice a-year. This town is celebrated for the number of gardens and nurseries in its vicinity, and is also particularly noted for the cultivation of liquorice. In one of the gardens here is a large ancient cave, the origin and purposes of which are unknown. The History of the Ancient Borough of Pontefract, &c. by B. Boothroyd, 8vo. 1807.

PONTELLA, a town of Portugal, in the province of Beira; 4 miles N.E. of Lamego.

PONTEQUE, or PONTIQUE, a cape with two small islands, on the W. coast of Mexico; 30 miles N.E. of cape Corrientes.

PONTES, in *Ancient Geography*, a Roman station of Great Britain, on the route from Londinum to Regnum, according to the Itinerary of Antonine.

PONTE-STAKE, in *Glass Making*, is the iron on which the under servants place the irons from the upper workmen, when they have knocked off the broken pieces of glass.

PONTE-VEDRA, or PONTEVEDRA, in *Geography*, a town of Spain, near the W. coast of Galicia; 25 miles N. of Tuy.

PONTEVICO, a town of Italy, in the department of the Mela: 18 miles S. of Brescia.

PONTEZUELO, a town of South America, in the government of Buenos Ayres; 132 miles N.W. of Buenos Ayres.—Also, a town of South America, in the province of Cordova; 150 miles N. of Cordova.

PONTHIEU, a small country of France, in Picardy, so called before the revolution, situated between the rivers Canche and Somme. Its capital was Abbeville.

PONTHIEVA, in *Botany*, received that appellation from Mr. R. Brown, in memory of the late Mr. Henry De Ponthieu, a French West Indian merchant, to whose communications the royal collection at Kew, and the her-

barium of fir Joseph Banks, are very greatly indebted.—Brown in Ait. Hort. Kew. v. 5. 199. Class and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*.

Eff. Ch. Anther united with the column, somewhat terminal, permanent. Corolla irregular. Lip posterior, inserted into the column along with the petals. Pollen farinaceous.

1. *P. glandulosa*. Glandular Ponthieva. (*Neottia glandulosa*; Sims in Curt. Mag. t. 842.)—Lip stalked, pointed. Petals half ovate.—Native of the West Indies. It flowers in our stoves from January to March. The leaves are radical, oval, recurved, wavy. Stem a foot high, downy, bearing a lax cluster of singular, but not ornamental, greenish-white flowers. Mr. Brown informs us he is possessed of one more species, as yet undescribed.

PONTI, in *Geography*, a town of Italy, in the Veronese; 2 miles S. of Peschiera.

PONTI, a town of France, in the department of the Marengo; 6 miles S.W. of Acqui.

PONTIA, PONZA, in *Ancient Geography*, an island near Sicily, at some distance to the W. of Campania. The Romans established here a colony. It was to this island that Tiberius banished Nero, the eldest son of Germanicus, and here he died of famine and wretchedness, A. D. 31.—Also, an island near the coast of Etruria, over-against Velia, according to Strabo and Pliny.—Also, an island situated on the coast of Africa, near that of Misinus. Ptolemy.

PONTIANA, in *Geography*, a river on the W. coast of Borneo, which runs into the sea, N. lat. $0^{\circ} 13'$.

PONTIANUS, pope, in *Biography*, a native of Rome, was elected to that see on the death of Urban, in the year 230. It was during his pontificate, that sentence of deposition and excommunication was passed upon the celebrated Origen, by Demetrius, bishop of Alexandria, which sentence was approved by Pontianus, who is supposed to have assembled the Roman clergy, for the purpose of having their sanction to that proceeding. Pontianus, in his turn, became the victim of persecution; for in the year 235, after the assassination of the emperor Alexander, by whom Christians had been favoured, his successor, at the instigation of the Pagan priests, exercised great oppression and cruelty against that people, and particularly against the bishops. Among others, Pontianus was persecuted by him, being banished from Rome to Sardinia, where he died, owing to the severe and cruel usage which he experienced, having filled the pontifical throne five years and a few months. Moreri. Bower.

PONTIBUS REPARANDIS, in *Law*, a writ, directed to the sheriff, commanding him to charge one or more persons to repair a bridge, to whom it belongs.

PONTICA GEMMA, in *Natural History*, a name given by the ancients to a stone of the agate kind, with a white ground and red and black spots, irregularly placed, and making a beautiful variegation in it. This seems to have been the same stone which some of the moderns have called the *small-pox* stone, from its spots resembling the eruptions in that disease. The ancients mention several kinds of it, as they were spotted with various colours.

PONTICA Vina, a term used to express acid, feculent, and tartarous wines.

PONTICCHIO, in *Geography*, a town of Naples, in the province of Capitanata; 4 miles W. of Dragonera.

PONTICUM MEL, a name given to a sort of poisonous honey.

PONTICUS MUS, in *Zoology*, the name of a creature described by the ancients, and supposed to be the same with our squirrel.

PONTICUSA, in *Geography*, a small island in the Grecian Archipelago; 2 miles S.W. of Stamfordia. N. lat. $36^{\circ} 33'$. E. long. 25° .

PONTIFEX, *Pontif*, *High-priest*, a person who has the superintendance and direction of divine worship; as the offering of sacrifices, and other religious solemnities.

The Romans had a college of pontifs, and over those a sovereign pontif, or *pontifex maximus*, instituted by Numa; whose function it was to prescribe those ceremonies with which each god was to be worshipped, compose the rituals, direct the Vestals, regulate the calendar, and settle the several games, and assist at them; and for a good while to perform the business of augury; till on some superstitious occasions he was prohibited intermeddling with it.

He consecrated the statues of the gods, before they were put up in the temple; conducted the dedications of the temples; offered sacrifices; blessed the figures of some of Jove's thunderbolts, to preserve the people from harms; and compiled their statutes.

The Jews, too, had their pontif, or high-priest; and among the Romanists, the pope is still styled the *sovereign* pontif.

Authors differ about the origin of the word pontifex. Some derive it from *posse facere*, that is, from the authority the pontifs had to sacrifice; others, as Varro, from *pons*, because they built the Sublician bridge, that they might go and offer sacrifice on the other side of the Tiber.

PONTIFICAL, PONTIFCALE, a book of the rites and ceremonies belonging to pontifs, bishops, popes, &c. See RITUAL, and CEREMONIALE.

PONTIFICAL Chapel. See MISERERE.

PONTIFICAL College, in *Roman Antiquity*, consisted of those who had the principal direction of the affairs of religion, who settled religious disputes, regulated the worship and ceremonies, and explained the mysteries of religion. This college, at the time of its first institution by Numa, was composed of four priests selected from the patricians, to whom were afterwards added four others from the plebeians. Sylla the dictator increased their number to fifteen, of whom eight were superior, and seven subordinate; and the chief among them assumed the title of "pontifex maximus."

PONTIFICALIA, the robes and ornaments in which a bishop performs divine service.

PONTIFICATE, PONTIFICATUS, the state or dignity of a pontif, or high-priest.

Cæsar reformed the calendar in the time of his pontificate.

PONTIFICATE is more peculiarly used in modern writers for the reign of a pope.

The concordat was passed in the pontificate of Leo X.

There was a pontificate that only lasted twenty-four hours.

PONTIGNY, in *Geography*, a town of France, in the department of the Yonne; 10 miles N.E. of Auxerre.

PONTIO, DON PIETRO, in *Biography*, an eminent Italian ecclesiastical composer. He published many learned compositions for the church at the latter end of the 16th century. He was likewise author of musical discourses; "Raggionamenti della Musica." This last work, which is in dialogue, was written by an eminent composer, of whose productions there are still excellent specimens subsisting. The author, however, though a practical musician, could not shun the pedantry of the times; but instead of going directly to work like a man of business, loses his time in calculating ratios, or transcribing them from Boethius, or other authors who had pillaged him already, bestowing upon the reader twenty pages of his small quarto tract upon speculative definitions, and arithmetical, geometrical,

and harmonical proportions; to which, if a practical musician understood them, he would never apply for help while he had the free use of his hands and ears. At length, having impressed his reader with a due sense of his profound science and erudition, the author, descending from the spheres, deigns to treat of the music of this nether world; and in his second *Ragionamento* gives precepts and examples for the use of all the concords and discords; in the third he goes through all the ecclesiastical tones; and in the fourth and last, all the moods and divisions of time; terminating his discourse with short instructions for composing masses, motets, psalms, madrigals, and *ricercari*. This term, which implied any work of fancy, and original invention, was succeeded by *fantasia*, as fantasia was by *sonata*. Adrian Willaert, and others of his time, composed *ricercari*, without words for the voice, which were a species of *solfeggi*. In the course of this little work, the author, though a composer himself, frequently refers to the productions of others. Among these, his favourites seem to have been Josquin, Giachetto, Morales, Adriano, Cipriano, Palestrina, and Vincenzo Ruffo. The theorists he cites are chiefly Franchinus, P. Aaron, Lanfranco, Fogliano, Zarlino, and Galilei. As a specimen of his own abilities in composition, we shall present the reader with a movement selected by the learned Padre Martini (*Saggio di Contrap. pt. i. p. 178.*), from the second book of his Magnificats. The subject of the composition is the Romish chant of the Magnificat in the eighth mode or tone, which is led off by the treble, accompanied by the counter-tenor and base in the counterpoint. At the fifth bar, the second tenor begins the chant, and at the seventh is answered by the first tenor in the 5th, at the distance of which interval these two parts continue in strict canon to the end.

PONTIS, LEWIS DE, a gentleman of Provence, born in the year 1583, was brought up to the military service. He entered the army under Henry IV., and served that king and his successor with great courage and fidelity. At length, disappointed in his expectations of promotion, he retired after fifty years' service, and devoted the remainder of his life to religious retirement. He died in 1670, at the age of 87. There are extant "Memoirs," under the name of De Pontis, printed at Paris in 2 vols. 12mo. Moreri.

PONTIUS, an ecclesiastical writer of the third century, was a native of Africa, and flourished about the year 250. He was appointed deacon to St. Cyprian, in the church of Carthage, and attended that father in his various fortunes, particularly during his last exile, and at his martyrdom. Pontius was the biographer of his friend, and wrote "The Life and Passion of Cyprian," which is generally prefixed to his works. Pontius is thought by some writers to have suffered martyrdom in the year 258.

PONTIUS, CONSTANTINE, a Spanish divine of great merit, and celebrated preacher in the 16th century, who was persecuted by the holy Inquisition for having imbibed the Protestant doctrine. He was a native of the town of St. Clement, in the diocese of Cuença, in New Castile, and appears to have received his academical education at the university of Valladolid. He became an excellent linguist, and acquired a high character for learning and eloquence. He had the degree of doctor of divinity conferred upon him, and obtained a canonry in the metropolitan church of Seville. He was also appointed to fill the theological chair at a lecture that was founded in that city, and displayed great erudition in his comments and explanations of various parts of the scriptures. He was so well skilled in all the beauties of his native language, and possessed such powers of elo-

quence, that he drew together an incredible number of auditors. So eager were the people to hear him, that crowds assembled for that purpose several hours before he entered the pulpit. He was appointed preacher to the emperor Charles V. and afterwards to his son Philip II., whom he attended into England, where he became a convert to the principles of the reformation. After his return to Spain, he resumed his employment of preacher at Seville, and by the style and manner of his discourses, subjected himself to the attacks of the priests and monks; who, at length, were not content with answering him in his own way, but made a seizure of his books, which he had endeavoured carefully to conceal, and among them one was found in his own hand-writing, containing a pointed condemnation of the leading points in the Popish creed. He now made no hesitation in avowing his principles, and declared his determination to maintain the truth of them. He urged his enemies to give themselves no sort of trouble in procuring witnesses against him, but to dispose of him as they pleased. He was speedily condemned and thrown into prison, where he was kept for two years, under sentence of condemnation to the flames. Before the day of the "Auto de Fe," on which it was to be carried into execution, he died of a dysentery, occasioned by the excessive heat of his place of confinement, and the want of proper food. His enemies reported that he had laid violent hands on himself, to escape the disgrace of a public execution. They were not satisfied with calumniating him: they burnt his remains and effigy, having first exposed them in a public procession. As an author, his works were "Commentaries" on the Proverbs, Ecclesiastes, the Song of Solomon, and Job; "A Summary of the Christian Doctrine;" "Sermons," and other smaller pieces. Moreri. Bayle.

PONTIVY, in *Geography*, a town of France, and principal place of a district, in the department of the Morbihan, seated on the river Blavet. The town contains 3090, and the canton 14,029 inhabitants, on a territory of 282½ kilometres, in 5 communes. It has a linen manufacture; 21 miles N.N.E. of Hennebon. N. lat. 48° 4'. W. long. 2° 53'.

PONTLEVIS, in the *Manege*, a disorderly resisting action of a horse, in disobedience to his rider; in which he rears up several times, and rises so upon his hind legs, that he is in danger of coming over. It is cured by clapping spurs smartly to him, as the fore-feet are returning to the ground.

PONTOGLIO, in *Geography*, a town of Italy, in the department of the Mela; 16 miles W. of Brescia.

PONTOISE, a town of France, and principal place of a district, in the department of the Seine and Oise, situated on a hill near the Oise, and defended by a castle. The place contains 5200, and the canton 14,716 inhabitants, on a territory of 140 kilometres, in 17 communes. N. lat. 9° 3'. E. long. 2° 11'.

PONTOON, in *Naval Language*, denotes a low flat vessel, resembling a lighter or barge of burthen, and furnished with cranes, capsterns, tackles, and other machinery, necessary for careening ships of all sizes. These are very common in the principal ports of the Mediterranean, but rarely used in the northern parts of Europe. Falconer.

PONTOON, or *Ponton*, in *War*, denotes a kind of flat-bottomed boat, whose carcass of wood is lined within and without with tin. The French pontoons, and those of most other powers, are covered on the outside with strong copper plates, without any inside lining; and these have the advantage of our's, because copper is much stronger than tin, and is not damaged by rust. Our pontoons are

twenty-one feet long, nearly five feet broad, and two feet one inch and a half deep within.

PONTOON-Bridge is made of pontoons slipped into the water, and placed about five or six feet asunder; each fastened with an anchor, when the river has a strong current, or to a strong rope, that passes across the river, and runs through the rings of the pontoons. Each boat has an anchor, cable, baulks, and chests. The baulks are about five or six inches square, and twenty-one feet long. The chests are boards joined together by wooden bars, about three feet broad, and twelve feet long. The baulks are laid across the pontoons at some distance from one another, and the chests upon them joined close. When several of these are thus connected, they form one firm, uniform bridge, by means of which a train of artillery, cavalry, infantry, &c. may pass over a river, arm of the sea, &c. If pontoons, &c. are wanting, bridges are formed of empty casks or barrels, that support baulks and planks.

Cæsar and Aulus Gellius both mention pontoons; but their's were no more than a kind of square flat vessels, proper for the carrying over of horse, &c. Our's, however, take their names from them: those authors call them *pontones*, of *ponto*.

PONTOON-Carriage is made with two wheels only, and two long side-pieces, whose fore ends are supported by a limber; and serves to carry the pontoons, boards, cross-timbers, anchors, and every thing else necessary for making a bridge.

PONTOPPIDAN, ERIC, in *Biography*, a Danish divine, was born in the isle of Funen, and being brought up to the church, he obtained various preferment, and was at length appointed to the bishopric of Drontheim, in Norway, where he died in 1678, at the age of 62. He published several learned works, particularly a grammar of the Danish language. His nephew, of the same name, became bishop of Bergen, and distinguished himself by a history of the Reformation in Denmark, and another of Norway, of which the last has been translated into the English language. He was author of many other works, the titles of which are given in the *General Biography*. This author was born at Aarhus; he received the early part of his education at the Frederician school, and having gone through his academical examination, became private tutor to the son of lieutenant-general Lützwow, in Norway. In 1726 he attended on a foreign tour another pupil, and was afterwards appointed preceptor to the young duke of Holstein. After filling various offices in the church he was promoted, in 1735, to be preacher to the Danish court; in 1738 he was appointed professor extraordinary of divinity, and in 1747 was raised to the bishopric of Bergen. In 1749 he obtained the degree of doctor of divinity, and in 1755 was made vice-chancellor of the university of Copenhagen. He died in 1764.

PONTORSON, in *Geography*, a town of France, in the department of the Channel, and chief place of a canton, in the district of Avranches, seated on the Coesnon, near the sea, with a tide-harbour; nine miles S.S.W. of Avranches. The place contains 1320, and the canton 8603 inhabitants, on a territory of 255 kilometres, in 16 communes. N. lat. 48° 33'. W. long. 1° 26'.

PONTREMOLI, a town of Etruria, on the Magra, well fortified and defended by a castle; 20 miles S.S.W. of Parma. N. lat. 44° 26'. E. long. 9° 50'.

PONTRIEUX, a town of France, in the department of the Northern Coasts, and chief place of a canton, in the district of Guingamp; seven miles N. of Guingamp. The place contains 1276, and the canton 10,229 inhabitants, on

a territory of 130 kilometres, in eight communes. N. lat. 48° 41'. W. long. 3° 4'.

PONT-VOLANT, FLYING-BRIDGE, a kind of bridge used in sieges. See **BRIDGE**.

PONTUS, in *Ancient Geography*, an extensive country of Asia Minor, which derived its name either from the neighbouring sea, called by the Latins Pontus Euxinus, or from an ancient king, who gave his name both to the country and the adjacent sea. The country of Pontus, appropriately so denominated, lay between the 41st and 43d degrees of N. lat., and was bounded on the N. by the Euxine sea, on the S. by Armenia Minor, on the E. by Colchis, and on the W. by the river Halys. Ptolemy divided this country into three parts, *viz.* Pontus Galaticus, Pontus Polemoniatus, and Pontus Cappadocius. The former derived its name from Galatia, to which it was added in the time of the Romans, and extended from the Halys to the river Thermodon. Its chief cities were Amisus, Eupatoria, Amasia, Themiscyra now Fanagoria, Cabira, and Comana, called Pontica. The second part of Pontus was called Polemoniatus from Polemon, king of this country, and extended from the Thermodon to the country of the Chalybes, or Pontus Cappadocius. Its most considerable cities were Næocesarea, Sebastia, Zela, called also Megalopolis, and Polemonium. This is supposed to have been the kingdom of the Amazons, who admitted among them no men, and yet were famous for warlike exploits. Pontus Cappadocius bordering on Cappadocia, whence its name, extended from Pontus Polemoniatus to Colchis, and had for its southern boundaries Armenia Minor and the upper stream of the Euphrates. Its chief cities were Cerasus, Tripoli, and Trapezus, or Trebisond, now called Trabofan.

The chief rivers of Pontus are the Halys, Iris now Calsmack, and the Thermodon. The air of this country was reckoned salubrious, and the soil in many places was fertile; the hills being mostly covered with olive or cherry-trees, and the plains, watered by small rivers, producing grain in abundance. Tradition reports, that the ancient inhabitants of this country were the descendants of Tubal, who in process of time became intermixed with Cappadocians, Paphlagonians, and other foreign nations, besides several colonies of Greeks. As for their arts and manufactures, the Chalybes, or inhabitants of Pontus Cappadocius, were celebrated by the ancients for their extraordinary skill in the working of iron and the making of steel armour, whence they derived their name. They were probably a commercial people, as they had many convenient harbours on the Euxine sea, and great quantities of timber, fit for the building of ships, and growing on the coast. Their language and religion were much the same with those of Cappadocia. Their chief deities were Ceres, Jupiter, and Neptune; to whom they offered burnt sacrifices, pouring on the fire honey, milk, oil, and wine. In honour of Neptune, they used to drive into the sea chariots drawn by four white horses, which they drowned.

This country was originally a part of Cappadocia, extending from mount Taurus to the Euxine sea, and was divided into several petty kingdoms, which, according to Diodorus Siculus, were first subdued by Ninus. The Medes and Persians became alternately masters of it; and the latter divided Cappadocia into satrapies, or governments; and bestowed that satrapy, which was afterwards named Pontus by the Macedonians, on one of the ancestors of Mithridates. This happened, it is said, in the reign of Darius, son of Hystaspes, who conferred this new kingdom on one Artabazes, of the royal family of Persia; so that Pontus, which to that time had been merely a province of Cappadocia,

docia, began to be governed by its own kings, and was a separate kingdom in the reign of Darius Hystaspes. However, in the reign of Ariobarzanes, the inhabitants, who had paid tribute to the Persians and were their vassals, shook off the Persian yoke, and their sovereign enlarged his small kingdom. In process of time the kings of Pontus became very considerable, having added to their dominions all Cappadocia, Paphlagonia, and great part of Bithynia to the W., and of Colchis to the S.; inasmuch that Mithridates VII. surnamed Eupator, was regarded as one of the most powerful princes that ever reigned in the East, having held it for forty years successively against the Romans, though their armies were commanded by the greatest generals ever produced by Rome, namely, Sylla, Lucullus, and Pompey. The first king of Pontus, that ever entered into an alliance with the Romans, was Mithridates VI., who sent them a considerable supply of ships in their third war with the Carthaginians, and proved a faithful ally to them in the war which they carried on against Aristonicus, who, upon the death of Attalus, laid claim to the kingdom of Pergamus. Mithridates VII. ascended the throne at eleven years of age, and his future greatness is said to have been prefigured by two comets, one of which appeared at his birth, and another in the first year of his reign. He began his reign with several inhuman and unnatural acts of cruelty; and marked the progress of it with characters of blood. He drove the Romans out of Asia; and over-ran all Phrygia, Mysia, Asia Proper, Caria, Lycia, Pamphylia, Paphlagonia, Bithynia, and other countries that had taken part with the Romans, as far as Ionia. All the free cities of Asia opened their gates at his approach; and as many Roman citizens were dispersed over Asia, he ordered them all to be massacred (B.C. 88); one moiety of their goods being forfeited to the king, and the other bestowed as a reward on the assassins. He also reduced several islands in the Archipelago. At length he sustained a signal defeat by Sylla, near Chæronea (B.C. 84.) In the following year a treaty of peace was concluded between them. After several sanguinary contests, Lucullus reduced Pontus into a Roman province; and was succeeded in the conduct of the war against Mithridates by Pompey. Upon the death of Mithridates, his son Pharnaces submitted himself and his kingdom to the Romans. Pompey bestowed the kingdom of Bosphorus on Pharnaces, and honoured him with the title of a friend and ally of the people of Rome; and in consequence of these measures, he got entire possession of Pontus, with its immense treasure, and reduced it to the form of a Roman province. After the return of Pompey to Rome, Pharnaces recovered great part of his hereditary dominions; but when Cæsar had defeated Pompey and his party, he directed his forces against Pharnaces, who sent ambassadors to him to treat of a peace. The conditions proposed by Cæsar were, that Pharnaces should retire immediately from Pontus, return all captives and hostages, whether they were Romans or their allies, and restore the effects of the Roman citizens and publicans which he had seized since he first took up arms. Pharnaces professed to accede to these conditions, but in the fulfilment of them he manifested a considerable degree of duplicity and delay, so that Cæsar was incensed, marched against him, and defeated him. In attempting to recover the kingdom of Bosphorus, which he lost in this contest, he fell in battle; and upon his death, the kingdom of Pontus was again reduced to the form of a Roman province, and so continued till the triumvirate of Marc Antony; who, after the battle of Philippi, conferred it upon Darius, the son of Pharnaces, for his service during the civil war. Darius was succeeded by Polemon, son of Zeno, a famous

orator of Laodicea. Upon his death, his son Polemon II. was, by the emperor Caligula, raised to the throne of Bosphorus and Pontus. But the emperor obliged him to exchange the kingdom of Bosphorus with part of Cilicia; and Nero, with his consent, reduced that part of Pontus which he enjoyed to the form of a province. Polemon dying without issue, the ancient kingdom of Pontus was divided into several parts, and added to the provinces of Bithynia, Galatia, and Cappadocia, only that part of it which was called Pontus Polemoniacus retaining the dignity of a distinct and separate province. The kingdom of Pontus continued to be a province of the empire till the time of David and Alexis Comneni, who, being driven from Constantinople by the French and Venetians, under the command of Baldwin, earl of Flanders, settled, the one at Heraclea, the other at Trebifond. The troubles that arose among the Latins, gave Alexis an opportunity of erecting here a new empire, which comprehended great part of Pontus, and was known by the name of the empire of Trebifond, which see. The Comneni held it above 250 years, till the time of Mahomet II., who carried David Comnenus, the last emperor of Trebifond, prisoner to Constantinople, with all his family, and subjected his empire to that of Constantinople, in which state of abject slavery, Trebifond and all Pontus have ever since continued.

PONTUS *Euxinus*. See *EUXINE Sea*.

PONTYPOOL, or PONT-Y-POOL, in *Geography*, a market-town in the parish of Trevethin, and in the upper division of the hundred of Abergavenny, Monmouthshire, England, is situated at the distance of $6\frac{3}{4}$ miles W. from Usk, and 146 miles W. by N. from London. This place is of modern origin, and owes its present importance entirely to the influence of trade. Its name is a corruption of Pont ap Howell, or Howel's Bridge. The houses here are chiefly ranged in two principal streets; but from the number of detached buildings, the town has a straggling appearance. Most of the inhabitants are engaged in the coal and iron works, carried on in the immediate vicinity. The iron ware, known by the name of *Pontypool ware*, is the chief manufacture of this town: it is called also Japan ware, because bearing a strong resemblance to Japanese lackered wood. The discovery of the art of japaning was accidentally made by a person named Thomas Allgood, who had fixed his residence at Pontypool in the reign of Charles II. He did not, however, live long enough to bring his discovery to perfection; but his son Edward, pursuing the same object with increasing spirit, effected such improvements in it as induced him to establish an extensive japan manufactory here, which is still carried on by one of his descendants. The iron-works of this place are indebted for their commencement to Capel Hanbury, esq., who purchased an estate at Pontypool in 1565. They did not, however, acquire much national importance till the beginning of the last century, when they were greatly extended and improved by major Hanbury, aided by the advice and exertions of Edward Allgood above-mentioned. The latter, on one occasion, made use of an artifice to obtain a secret in the wire manufacture, the fairness and propriety of which are at least questionable. Observing that the Woburn manufacturers understood the method of polishing that article in a very superior manner, and being refused a communication of the art, he repaired to Woburn, in the character of a beggar, and acting the part of a buffoon, gradually obtained access to the work-shops, and thus accomplished his object.

According to the parliamentary returns of 1811, the parish of Trevethin contains 469 houses, and 2423 inhabitants,

habitants, of whom two-thirds are resident in the town. The market-day is Saturday, and there are three annual fairs. The parish church, which is an ancient structure, with a square stone tower at one end, stands upon an eminence, at the distance of a mile from Pontypool. In this church are several monuments to the memory of different members of the Hanbury family, whose seat is situated between it and the town. The house is singularly placed on a perpendicular cliff above the Avon-Lwyd, which forms the western boundary of the grounds. It contains various family portraits, and also original portraits of the duke and duchess of Marlborough, Frederic II. of Prussia, and of Robert Dudley, earl of Leicester, the weak and haughty favourite of queen Elizabeth. Here are also two pictures, representing groups of boys, by Murillo, which were presents from the great sir Robert Walpole to Capel Hanbury, esq., father to the present possessor, who has assumed the name of Leigh, in consequence of the will of the late lord Leigh.

Three miles from Pontypool rises the immense mountain Mynydd-Maen, at the south-western extremity of which is another hill of an oval shape, called Twyn-Barlwn, or Tom-Balam. The summit of this mountain is occupied by an elliptical entrenchment, near which is a large circular tumulus, 30 feet in height, and environed by a deep fosse. According to tradition, this spot was anciently appropriated for holding the bardic meeting, called Eisteddfod. An Historical Tour in Monmouthshire, by William Coxe, A.M., F.R.S., F.S.A., rector of Bemerton, 4to. 1801.

PONZA, a small island in the Mediterranean, near the coast of Naples, at the entrance of the gulf of Gaeta; containing a town, harbour, and considerable salt-works, belonging to the duchy of Parma. N. lat. $40^{\circ} 58'$. E. long. $12^{\circ} 50'$.

PONZANO, a town of Italy, in the Trevisan; 3 miles N.N.W. of Treviso.

PONZIAC, a town of the Birman empire, on the Ava; 16 miles S. of Raynangong.

PONZONE, a town of France, in the department of the Tanaro; 10 miles S. of Acqui.

POOD, in *Commerce*, denotes a weight in Russia, equal to 40 of their pounds; and amounting to 36 English pounds avoirdupois; and 63 poods = 1 ton avoirdupois.

POODACOTTA, in *Geography*, a town of Hindoostan, in the Carnatic; 30 miles W.N.W. of Trichinopoly.

POODICHERAM, a town of Hindoostan, in Myfore; 24 miles W.S.W. of Periapatam.

POODOOR, a town of Hindoostan; 5 miles S. of Coimbatore.

POODUCAUD, a town of Hindoostan, in Cochin; 27 miles E. of Cranganore.

POOKAREEAH, a circa of Bengal, bounded on the east and north by Dacca, on the south by Caugmahry, and on the west by Barbazzoo; about 36 miles long, and from 10 to 20 broad.

POOL, a river of West Florida, which runs into the gulf of Mexico, N. lat. $30^{\circ} 20'$. W. long. $88^{\circ} 12'$ —Also, a town on the east coast of the island of Gilolo. N. lat. $0^{\circ} 2'$. E. long. $127^{\circ} 50'$.

POOL is properly a reservoir of water supplied with springs, and discharging the overplus by sluices, defenders, weirs, and other caufeways.

POOL-Fisheries, in *Rural Economy*, such as are formed in pools, or other waters which are in some measure stagnant. Mr. Marshall has remarked, that these are for the most part peculiar to the places of men of fortune, and the residences of country gentlemen. He knows but of one district, in

which fish-pools are viewed as an object of rural economy. On every side of the metropolis, something of this kind is, he thinks, to be observed; but it is only on the south side, in the adjoining parts of Surrey and Sussex, where the practice of fish-breeding may be said to be established. There, he says, fish-pools have been, and still are, formed, with the view of letting them to dealers in carp, and other pond fish; or of stocking them, and disposing of the produce; as an article of farm-stock, like that of other sorts, such as pigs, rabbits, poultry, or pigeons.

However, in a general view of the kingdom, fish-pools can scarcely, he supposes, be considered as an object worthy of consideration in the improvement of landed property. Yet there are situations, he conceives, in which they may be formed with profit; as in the dips and hollows of extremely bad ground, especially if waters, which are genial to any of the species of pond-fish, happen to pass through them, or can be profitably led to them. Even where the water which can be commanded is of an inferior quality, a profitable breeding pool may be formed, to stock ponds of a more fattening nature, or other uses. See POND-Fisheries.

POOL, *Mill*. See MILL.

POOL, *Whirl*. See WHIRL-*Pool*.

POOL-Snipe, in *Ornithology*, a name given in many parts of England to the red-shank. See SCOLOPAX *Calidris*.

POOLAMPATY, in *Geography*, a town of Hindoostan, in Baramaul; 6 miles N. of Darempoury.

POOLANGE, a small island in the East Indian sea, near the coast of Borneo. N. lat. $3^{\circ} 25'$. E. long. $117^{\circ} 6'$.

POOLAPPAUK, a town of Hindoostan, in the Carnatic; 20 miles S.W. of Madras.

POOLARON, or PULO RHUN, one of the Banda or Spice islands, in the East Indian sea, chiefly inhabited by fishermen. S. lat. $4^{\circ} 12'$. E. long. $130^{\circ} 22'$.

POOLBADA, a town of Hindoostan, in Orissa; 10 miles S.E. of Jaypour.

POOLBARRY, a town of Bengal; 18 miles S.E. of Dinagepour. — Also, a town of Bengal; 24 miles N.W. of Goragot.

POOLE, MATTHEW, in *Biography*, a very learned and eminent English non-conformist divine, was born at York in the year 1624. At the grammar-school he laid an excellent foundation in classical literature, and afterwards went to Emanuel college in the university of Cambridge, where he applied himself with great diligence to the different branches of academical learning, and more particularly to the study of the sacred scriptures. Here he took his degree of M.A., and embraced the Presbyterian faith. He was, however, ordained, and became, about the year 1648, rector of St. Michael le Querne in the city of London. In 1654 he undertook to defend the cause of orthodoxy against John Biddle, and published a piece entitled "The Blaphemer slain with the Sword of the Spirit, or a Plea for the Godhead of the Holy Ghost." On the enforcement of the act of uniformity in 1662, he was ejected from his rectory; upon which occasion he printed a small Latin treatise, entitled "Vox Clamantis in Deserto." He now devoted himself very closely to his studies, and employed his pen in the service of religion, without any regard to the particular differences in sentiment which existed among Protestants. With this view he formed the design of abridging the "Critici sacri," and other expositors of scripture. He met with much encouragement from the learned men of all parties, and was zealously supported by some of the greatest names in the church, among whom was the celebrated Tillotson.

lotson. When the work was in a state of sufficient forwardness to be sent to the press, his majesty granted Mr. Poole a patent for the privilege of printing it; and in 1669, the first two volumes were published in London, under the title of "Synopsis Criticorum aliorumque S. Scripturæ Interpretum," which were afterwards followed by three others. This work cost the author almost an infinity of labour, but it reflected great honour on his industry, erudition, and judgment, and proved a very valuable present to biblical scholars. But notwithstanding its acknowledged merits, it was, till within a few years, to be purchased on very low terms: it is, however, now regarded as a rare book, and seldom to be met with in the catalogues. While employed on the "Synopsis," Mr. Poole found leisure to testify his zeal against Popery, by the publication of some excellent pieces on the subject, which drew down upon him the hatred of the Papists. To this it was probably owing that his name was inserted in the list of persons who were to be assassinated, according to the deposition of Titus Oates, concerning the Popish plot. He entertained no apprehensions on this account, till he was beset in Clerkenwell, as he was returning from Mr. alderman Ashhurst's. He believed that he should that night have been murdered, had not a friend been with him, and determined to leave the country. He accordingly retired to Holland, where he died in 1679, at about the age of 56, not without suspicion of poison. Of Mr. Poole's extensive knowledge, solid learning, and critical skill, his Synopsis affords the most satisfactory evidence. He was author of several other works, besides those that have been mentioned above; and he left behind him in MS. "Annotations on the Bible," in English, which death prevented him from extending beyond the 58th chapter of Isaiah. This work was afterwards continued by other hands, and published in two vols. folio, and has been frequently reprinted.

POOLE, in *Geography*, a considerable sea-port and borough town, and a county of itself, is locally situated within the county of Dorset, England, at the distance of 27 miles E. by S. from Dorchester, and 105 miles S.W. by W. from London. It stands on a peninsula, which is connected with the main land by a narrow isthmus, and derives its name from a large bay, or pool, adjoining. This town is of great antiquity, and, according to Horsley, was the Magnus-Portus of Ptolemy; but Camden and other antiquaries support the opinion of Richard of Cirencester, who places that station at Porchester. Leland attributes the rise of Poole to "the Danes warres," which "fore rased Wareham." After the Conquest it became the property of the earls of Sarum, who granted to it various privileges, which were confirmed and extended by different monarchs. In the time of Edward III. it seems to have been a place of some consideration, as it is recorded to have furnished that king with four ships and 94 men, to assist at the siege of Calais. It is described as being well inhabited in the reign of Henry VI., and was doubtless much favoured by his successors, Edward IV. and Richard III.; but for its most considerable privileges it is indebted to queen Elizabeth. That sovereign constituted it a corporate and free borough by charter, and further directed it to be separated from the manor of Canford, and formed into a distinct county, with power to appoint its own sheriff, &c. in the same manner as the town and county of Southampton. In virtue of that deed, Poole is now governed by a mayor, recorder, four aldermen, a sheriff, two coroners, a senior and a water bailiff, and eighteen common council-men. The mayor is chosen from among the common council-men, and is, *ex officio*, a justice of the peace, escheator of the town, and admiral within the liberties. He

was likewise anciently mayor of the staple. The sheriff and the water bailiff are nominated from the common council. Poole sends two members to parliament, who are elected by the burgeses, whether resident or otherwise. The number of voters is ninety-six, and the sheriff is the returning officer. This town first enjoyed the privilege of national representation in the reign of Edward III.; but it intermitted exercising the same from the 42d year of that monarch till the 31st year of Henry VI.

Poole consists of four considerable streets, running nearly north-east and south-west, and a fifth one crossing these, parallel with the quay, at the eastern extremity of which stands a custom-house; this being the most considerable port in the county. The town dues for goods landed are claimed by the corporation, and the customs sometimes amount to upwards of 10,000*l.* in one year. In former times this place was fortified; but its fortifications were dismantled by Charles II., as a mark of ignominy for the townsmen having shewn peculiar enmity to the interests of his father. They are still, however, visible, as are likewise a ditch and vallum constructed in the year 1745. The principal public buildings in the town are a church, a market-house, a town-hall, a wool-house, and a town-house, erected in 1727, by a company of merchants. The church is an ancient fabric, divided into a body, two aisles, and a tower, and containing a monument in honour of the gallant Mr. Peter Jolliffe, who was rewarded by William III. with a gold medal and a commission, for having, with two assistants only, gallantly boarded and captured a French privateer. The market-house was rebuilt in 1761, at the joint expence of Joseph Gullston, esq. and lieutenant-colonel Calcraft. The town-hall, where the quarter-sessions for the town, and occasionally the assizes, are held, was erected in 1571. The wool-house, called also the king's-hall, or great cellar, is partly of ancient and partly of modern construction.

Poole, in the time of Leland, was only "a poor fisher village;" but it is now one of the largest and most flourishing towns in Dorsetshire. According to the parliamentary returns of 1811, it contained 1059 houses, and 4816 inhabitants. A market is held here twice a week on Monday and Thursday, and fairs on the 1st of May and 2d of November. Here are several meeting-houses for Presbyterians, Quakers, and Anabaptists; also several grammar and charity-schools, and a well-attended Sunday-school, established by W. Morton Pitt, esq. In this town was anciently a house of friars, dedicated to St. George, which was granted, in the reign of Edward VI., to John Churchill and William Samways.

Poole-bay communicates by a narrow entrance with the British Channel: its circumference, including all the windings of the shore, and the projections of the mud banks, is estimated to exceed 60 miles. In its bosom are several small islands. That portion of it which is distinguished by the appellation of Pool-harbour, extends about four miles in length from North Haven to Redcliffe-Attwell on the Purbeck shore. The depth of water here averages about 14 feet. The trade of this port is chiefly confined to Newfoundland, and a number of young seamen are trained up in this fishery. The exports are provisions, nets, cordage, sail-cloth, and wearing apparel, with a variety of commodities for plantation consumption. The returns are cod and salmon, which are afterwards sent to foreign markets, oil, seal-skins, furs, and cranberries. The exports and imports of grain are likewise considerable. The number of ships belonging to Poole is stated at about 250, of which 140 are employed in foreign commerce, and 40 in the oyster and herring fisheries. The court of admiralty here is held

at a place called Brome-hill, on the quay; and its records are extant from the time of Edward VI. The mayor is president, and there is a jury impanelled to judge of causes within the jurisdiction. Formerly this court was convened annually, but is now at pleasure. Beauties of England and Wales, vol. iv., by E. W. Brayley and John Britton, F.S.A.

POOLE, or *Welch Poole*. See *WELCH-Poole*.

POOLGOURY, a town of Hindoostan, in Madura; 21 miles W. of Coilpetta.

POOLOO, a town of Pegu, on an island in the mouth of the Ava; 26 miles E. of Perfain.

POOLPETTI, a town of the island of Ceylon; 30 miles S.S.E. of Candy.

POOLPOUR, a town of Hindoostan; 50 miles W.N.W. of Benares.

POOL'S ISLAND, a small island in the Chesapeake. N. lat. $39^{\circ} 22'$. W. long. $76^{\circ} 23'$.

POOLYLOPU, a town of Hindoostan, on the coast of Malabar; E.N.E. 4 geographical miles from Cadiapatam point. N. lat. $8^{\circ} 8'$. E. long. $77^{\circ} 20' 50''$.

POON, a town of Hindoostan, in the circar of Hindia, on the left bank of the Nerbudda; 30 miles W. of Hindia.

POONACAMADA, a town of Hindoostan, in the circar of Rajamundry; 40 miles W. of Rajamundry.

POONAH, a town of Hindoostan, in the country of Vifiapour, and capital of the western Mahratta empire; situated about 30 miles on the east of the Gauts, 100 road miles from Bombay, and about 75 from the nearest sea-coast. It is meanly built, and not large; and lies quite open and defenceless. Pooronder, a fortress on a mountain, about 18 miles to the E.S.E. of Poonah, is the place of refuge in case of invasion: there the archives of government are deposited, and there the principal officers usually reside. Whenever an invasion has happened, the Mahrattas never thought Poonah a place worthy of defence; and have accordingly destroyed it with their own hands. In 1803 Poonah was taken by the British. N. lat. $18^{\circ} 30'$. E. long. $73^{\circ} 55'$.

POONAH, a town of Bengal; 6 miles N.E. of Ramgur.

POONAKHA, a town of Bootan; 12 miles N.E. of Taffasudon. N. lat. $27^{\circ} 55'$. E. long. $89^{\circ} 46'$.

POONAMALEE, a town of Hindoostan, in the Carnatic; 10 miles S.W. of Madras.

POONDY, a town of Hindoostan, in the circar of Cicacole; 10 miles N.E. of Tickely.

POONKUR, a town of Hindoostan, in Coimbetore; 3 miles N.E. of Damicotta.—Also, a town of Bengal; 30 miles S.S.E. of Beyhar.

POONRAH, a town of Bengal; 60 miles N.W. of Midnapour.

POONUGGA, a town of Bootan; 28 miles S. of Taffasudon.

POOP, in *Sea Language*, denotes the hind part of a ship, or that wherein the helm is fixed; called also *stern*.

The French frequently call it *queue*, tail, because the rudder here applied serves the same purposes in a ship as the tail does to fishes. The poop is divided into three or four stories, which all together form the poop castle, or hind-castle, the outside of which is richly adorned with balconies, galleries, trophies, the arms of the prince, &c.

To have the wind in poop, in *Sea-phrases*, is to have it behind, or favourable.

POOP, *Puppis*, *Stern*, denotes more particularly the highest or uppermost part of a ship's hull a-stern.

POOP-Royal is a short deck or plat-form, placed over the

aftmost part of the poop in the largest of the French and Spanish men of war, and serving as a cabin for their masters and pilots. This is usually called the top-gallant poop by our shipwrights.

POOPING, in *Sea Language*, denotes the shock of a high and heavy sea upon the stern or quarter of a ship, when she scuds before the wind in a tempest. This circumstance is extremely dangerous to the vessel, which is thereby exposed to the risk of having her whole stern beat inwards, by which she would be immediately laid open to the entrance of the sea, and, of course, foundered, or torn to pieces.

POOPOOR, a white cosmetic used in Sumatra for rendering the skin fine, smooth, and soft. The mode of preparing it is as follows. The basis is fine rice, which is a long time steeped in water, then dried, reduced to a powder, and by wetting made into a paste. With this they mix ginger, and the leaf of a plant called "deelum" (patch leaf), which gives it its peculiar smell, and also, as is supposed, a cooling quality. They add likewise the flowers of the "jagong" (maize), "cayoo chendano" (sandal wood); and the seeds of a plant called there "capay antoo" (fairy cotton), which is the "abel mosc," or musk seeds. All these ingredients, after being well mixed together, are made up into little balls; and when they would apply the cosmetic, these are diluted with a drop of water, rubbed between the hands, and then on the face, neck, and shoulders. They have an apprehension, probably well founded, that a too abundant or frequent application will, by stopping the pores of the skin, bring on a fever. It is used, with good effect, to remove that troublesome complaint, so well known to Europeans in India by the name of the prickly heat; but it is not always safe for strangers thus to check the operations of nature, in a warm climate. The Sumatran girls, as well as our English maidens, entertain a favourable opinion of the virtues of morning dew, as a beautifier; and believe, that by rubbing it to the roots of the hair, it will strengthen and thicken it. With this view they take pains to catch it before sun-rise, in vessels, as it falls. Marsden's Sumatra, p. 219.

POOPOOROO, in *Geography*, a small island in the East Indian sea, near the north-east coast of Borneo. N. lat. $6^{\circ} 18'$. E. long. $117^{\circ} 54'$.

POOR, PAUPER. A poor person, in a legal sense, is one who is a burden to and charge upon a parish.

It has been maintained by several authors of reputation, that the legal provision made for the poor by the last parliament of queen Elizabeth, was rendered necessary by the dissolution of the monasteries in the reign of her father. Before this event took place, it has been said that the wants of the indigent were relieved by the charity of the monks; and Dugdale remarks, that while the convents stood, there was no act for the relief of the poor, so amply were they provided for by these houses; whereas in the next age, there were no less than eleven bills brought into the house of commons for the purpose. That the monasteries afforded relief to the poor is a position maintained also by Smith and Blackstone; and the latter attributes to the dissolution of these the numerous statutes made in the reign of Henry VIII. and his children, for providing for the poor and impotent. This account of the origin of the poor laws has not, however, passed without contradiction. Mr. Alcock, who in 1752 published observations on the defects of the poor laws, has strongly objected to it. If the abbies maintained the poor, says this writer, how came the poor not to have been equally destitute in other Protestant countries, on the secularization of them? And how came the

the poor laws not to have passed here in England immediately on the dissolution or secularization, when the poor, we must suppose, were most to seek for a maintenance, and no new resources were yet opened? How did they subsist in the latter part of the reign of Henry VIII., through the whole reign of Edward VI., during the reigns of queen Mary and of queen Elizabeth, till about a year before the death of the latter, that is, near 70 years in the whole? The same train of argument is pursued by Mr. Daines Barrington, in his Observations on the more ancient Statutes. Mr. P. Andrews, in his Continuation of Henry's History of Great Britain, has remarked, in support of the same opinion, that the first act, which immediately affected the poor, was passed by Henry VIII., some years before the dissolution of religious houses; which remark, he adds, confutes at once the favourite system of those who date the commencement of the poor's rates from the destruction of monasteries. It is, however, observed by an ingenious anonymous writer (*ubi infra*), that statutes for the regulation of beggars are of much older date in England than the reign of Henry VIII.; nor does the act 22 Hen. VIII. c. 12, on which Mr. Andrews builds his whole conclusion, contain any provision for a compulsory poor's rate; and it by no means follows, that though in the preamble to that act complaint is made of the increase of beggars and vagabonds, that when monasteries were afterwards suppressed, these beggars were not reduced to greater misery. Besides, it is not correct to say, that from the 27th and 31st of Henry VIII., when the monasteries were dissolved, to the 43d of Elizabeth, when the present system of poor's rates was established, no laws were made for the relief and maintenance of the poor. From the 22d of Henry VIII. to the 43d of Elizabeth, hardly a parliament met, in which some laws that regarded the poor were not enacted. On the other hand, it must be admitted, that no mode of administering relief to the indigent is more likely to increase the evil which it is meant to alleviate than the charity of convents. Such charity augments the number of the indigent; and therefore, says our author, the suppression of monasteries cannot have been the cause of that enormous addition to the poor, which took place in England during the 16th century, notwithstanding the general improvement of the kingdom at that period, and the manifest increase of wealth and comfort among the higher and middling classes of society. It appears likewise, from an account of the regulations concerning mendicity in Spain, from the earliest times to the reign of Charles III., by Sempere y Guerinós, in the first volume of his "*Biblioteca Economico-politica*," and from the similarity of the English poor laws with those of Spain at the same time, that the popular opinion, which ascribes to the dissolution of convents the origin of our poor laws, is unfounded. In other Catholic countries, where no monasteries were suppressed, regulations for the poor became necessary about the same period. Hence it has been inferred, that the increase of the poor, which led to the English poor rates, was not owing to the dissolution of monasteries in England, but to some cause of more general operation, which extended its influence to other countries of Europe, that did not embrace the Protestant faith, nor suppress the religious institutions of their ancestors. This cause, the ingenious writer, whose remarks we are citing, inclines to think was the discovery of America, and consequent depreciation of the precious metals. This depreciation of money has the same effect on the circumstances of the labourer as a bad harvest. Commodities rise in price; and if the change in the value of money is progressive for a number of years, he suffers the same hardships as from a

succession of bad seasons, which every year become worse. While money continues to sink, the labourer, though occasionally relieved by an advance of wages, feels himself exposed, in a few years, to a recurrence of the same difficulties. In a little while he will be reduced to indigence; and from indigence to beggary the transition is short; and he who cannot maintain himself by his own labour, will seek for support in the benevolence of others. By a train of such reasoning it appears, that the natural effect of a gradual depreciation of money, when not counteracted by an extraordinary, steady, and progressive demand for labour, is to impair the comfort, and reduce the condition of the labouring part of the community, and to drive many of them to habits of idleness and beggary. That this was the case in England during the 16th century, that the number of the poor was continually increasing, that the country was overrun with idlers and vagrants, we have the authority of the poor laws to prove, and the concurrent testimony of all contemporary authors to corroborate. The writer, now cited, proceeds to shew, that from the discovery of America to the end of the 16th century, there was a gradual rise of prices in England, not accompanied by a corresponding rise in the price of labour. *Edinburgh Review*, N^o 43.

Formerly, the maintenance of the poor was chiefly an ecclesiastical concern; and a fourth part of the tithes in every parish was set apart for that purpose. The minister, under the bishop, had the principal direction in the disposal of it, assisted by the churchwardens and other principal inhabitants: hence naturally sprung the parochial settlement. Afterwards, when the tithes of many parishes were appropriated to the monasteries, these societies were the principal resource of the poor, who were farther relieved by voluntary contributions. But though the relief of the poor was in a great degree an ecclesiastical concern, it is not true, as some have imagined, that the common law of England made no provision for the poor. The "*Mirror*" (c. 1. § 3.) shews the contrary; but it does not appear how it was done. (1 Bur. 450.) Judge Blackstone observes, that till the statute 27 Hen. VIII. cap. 25, he finds no compulsory method for providing for the poor; their relief depending upon the humanity of their neighbours. But upon the total dissolution of the monasteries, the inconvenience of thus encouraging the poor in habits of indolence and beggary, who had been accustomed to partake of the alms daily distributed at the gates of religious houses, was gradually felt throughout the kingdom; and abundance of statutes were made in the reign of Henry VIII., Edw. VI., and Elizabeth, for this purpose. These poor were principally of two sorts: sick and impotent, and therefore unable to work; idle and sturdy, and therefore able, but not willing, to engage in any honest employment. To provide, in some measure, for both of these, in and about the metropolis, Edward VI. founded three royal hospitals: Christ's and St. Thomas's, for the relief of the impotent through infancy or sickness; and Bridewell, for the punishment and employment of the vigorous and idle; but these were found to be insufficient for the care of the poor through the kingdom at large. At length, by stat. 43 Eliz. cap. 2, overseers of the poor were appointed in every parish. See *OVERSEERS*.

The two great objects of the statute of Elizabeth seem to have been, 1st, to relieve the impotent poor, and them only; 2d, to find employment for such as are able to work: and this principally by providing stocks of raw materials to be wrought up at their separate towns, instead of accumulating all the poor in one common workhouse; a practice which puts the sober and diligent upon a level (in point of their earnings) with those who are dissolute and idle, de-

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presses the laudable emulation of domestic industry and neatness, and destroys all endearing family connections, the only felicity of the indigent. Whereas, if none were relieved but those who are incapable of getting their livings, and that in proportion to their incapacity; if no children were removed from their parents, but such as are brought up in rags and idleness; and if every poor man and his family were regularly furnished with employment, and allowed the whole profits of their labour:—a spirit of busy cheerfulness would soon diffuse itself through every cottage; work would become easy and habitual, when absolutely necessary for daily subsistence; and the peasant would go through his task without a murmur, if assured that he and his children, (when incapable of work through infancy, age, or infirmity,) would then, and then only, be entitled to support from his opulent neighbours. This appears to have been the plan of the statute of queen Elizabeth; and as far as this was the case, it was wise and laudable. The only, or at least the principal, defect of it seems to have been confining the management of the poor to small parochial districts; which are frequently incapable of furnishing proper work, or providing an able director. However, the labouring poor were then at liberty, under certain limitations to be hereafter mentioned, to seek employment wherever it was to be had; none being obliged to reside in the places of their settlement, but such as were unable or unwilling to work.

POOR-Rate. It is curious to trace in succession the several gradations by which the compulsory maintenance of the poor became established in this kingdom. By a statute made in the 12 Rich. II. c. 7, the poor were restrained from wandering abroad, and were required to abide in the towns where they were born, or in other places within the hundred; within which districts they were allowed to beg. By the 22 Hen. VIII. c. 12, the justices were to distribute themselves into several divisions, within which divisions respectively they might license persons to beg. By the 27 Hen. VIII. c. 25, the several hundreds, towns corporate, parishes, or hamlets, were required to sustain the poor with such charitable voluntary alms, as that none of them might of necessity be compelled to go openly in begging, on pain that every person making default should forfeit 20s. a month. And the churchwardens or other substantial inhabitants were to make collections for them with boxes on Sundays, and otherwise by their discretions. And the minister was to take all opportunities to exhort and stir up the people to be liberal and bountiful. By the 1 Edw. VI. c. 3, houses were to be provided for them by the devotion of good people, and materials to set them on work; and the minister, after the gospel every Sunday, was specially to exhort the parishioners to a liberal contribution. By the 5 & 6 Edw. VI. c. 2, the collectors of the poor on a certain Sunday in every year, immediately after divine service, were to take down in writing what every person was willing to give weekly for the ensuing year; and if any should be obstinate, and refuse to give, the minister was gently to exhort him; if he still refused, the minister was to certify such refusal to the bishop of the diocese, and the bishop was to send for him to induce and persuade him by charitable ways and means, and so according to his discretion to take order for the reformation thereof. By the 5 Eliz. c. 3, if he stood out against the bishop's exhortation, the bishop was to certify the same to the justices in sessions, and bind him over to appear there; and the justices at the said sessions were again gently to move and persuade him; and, finally, if he would not be persuaded, then they were to assess him what they thought reasonable towards the relief of the poor, and in case of refusal, were to commit him till paid.

By the 14 Eliz. c. 5, power was given to the justices to lay a general assessment; and this hath continued ever since. For by 43 Eliz. c. 2, the churchwardens and overseers of the poor of every parish, or the greater part of them, (with the consent of two or more justices, one of whom is of the quorum, dwelling in or near the parish,) are empowered to raise weekly, or otherwise, by taxation of every inhabitant, parson, vicar, and other, and of every occupier of lands, houses, &c. materials for employing the poor, and competent sums for their relief. Notice shall be given in church of every such rate the next Sunday after it is allowed, which may be inspected by every inhabitant, paying 1s., and copies of it granted on demand, 6d. being paid for every twenty-four names; and a churchwarden or overseer refusing, shall forfeit 20l. to the party aggrieved. The rate is to be levied by distress on those who refuse to pay it; and appeals against it are allowed. 17 Geo. II. c. 2. c. 38. 41 Geo. III. c. 23. See **RATE**.

If the justices find, that the inhabitants of any parish are not able to levy among themselves sufficient sums for the purposes specified in the act, they may assess any other parish within the hundred; and if the hundred be unable to grant necessary relief, they may rate and assess any parish within the county. 43 Eliz. c. 2.

Concerning the obligation of parents and children, see **PARENT** and **CHILD**.

In order to compel husbands and parents to maintain their own families, the law hath provided, that all persons running away out of their parishes, and leaving their families upon the parish, shall be deemed and suffer as incorrigible rogues. (1 Jac. cap. 4.) And if a person merely threatens to run away and leave his wife and children upon the parish, he shall, upon conviction, before one justice by confession, or oath of one witness, be committed to the house of correction, for any time not exceeding one month. 17 Geo. II. cap. 5.

If persons, who have some estates, run away and leave their children chargeable to the parish, it shall be lawful for the churchwardens or overseers, where any such wife, child, or children shall be so left, on application to, and by warrant or order of two justices, to take and seize so much of the goods and chattels, and receive so much of the annual rents and profits of the lands and tenements of such husband, father, or mother, as two such justices shall order and direct, towards the discharge of the parish or place where such wife, child, or children are left, for the bringing up and providing for such wife, child, or children; which warrant or order being confirmed at the next quarter sessions, it shall be lawful for the justices there to make an order for the churchwardens or overseers to dispose of such goods or chattels by sale or otherwise, or so much of them for the purposes aforesaid, as the court shall think fit, and to receive the rents and profits, or so much of them as shall be ordered by the said sessions, of his or her lands and tenements for the purposes aforesaid. 5 Geo. III. c. 8.

And whereas several persons, by their wilful default and neglect, permit their wives and children to become chargeable to their parish: it is enacted, that if it shall be made appear to two justices, that any such person doth not use proper means to get employment, or if he be able to work, by his neglect of work, or by spending his money in ale-houses or places of bad repute, or in any other improper manner, and do not apply a proper portion of the money he earns towards the maintenance of his wife and family, by which they or any of them become chargeable to their parish, he shall be deemed an idle and disorderly person, and punished accordingly. 32 G. 3. c. 45.

POOR.

For the farther maintenance of the poor, there are many fines and forfeitures payable to their use: as for swearing, drunkenness, destroying the game, &c. And also parts of wastes, woods, and pastures, may be inclosed for the growth and preservation of timber and underwood for their relief. See *WORK-house*.

POOR, Settlement and Removal of the. The first rudiments of parish settlements seem to be the statutes 12 Ric. II. c. 7. and 19 Hen. VIII. c. 12. which direct the poor to abide in the cities or towns where they were born, or such wherein they had dwelt for three years, a term afterwards (*viz.* by 39 Eliz. c. 4.) confined, in the case of vagabonds, to one year only. But after the Restoration, by 13 & 14 Car. II. c. 12. a legal settlement was declared to be gained by birth; or by inhabitancy, apprenticeship, or service for forty days; within which period all intruders were made removable from any parish by two justices of the peace, unless they settled in a tenement of the yearly value of 10*l.* The frands, naturally consequent upon this provision, which gave a settlement by so short a residence, produced the statute 1 Jac. II. c. 17. which directed notice in writing to be delivered to the parish officers, before a settlement could be gained by such residence. Subsequent provisions allowed other circumstances of notoriety to be equal to such notice given; and those circumstances have from time to time been altered, enlarged, or restrained, whenever the experience of new inconveniencies, arising daily from new regulations, suggested the necessity of a remedy. And the doctrine of certificates was invented, by way of counterpoise, to restrain a man and his family from acquiring a new settlement by any length of residence whatever, unless in two particular excepted cases; which makes parishes very cautious of giving such certificates, and of course confines the poor at home, where frequently no adequate employment can be had. The law of settlements may be, therefore, now reduced to the following general heads; or a settlement in a parish may be acquired, 1. *By birth*; for wherever a child is first known to be, that is always *prima facie* the place of settlement, until some other can be shewn. This is also always the place of settlement of a bastard child; for a bastard having, in the eye of the law, no father, cannot be referred to his settlement, as other children may. However, this rule admits of several exceptions which render the mother's settlement that of the child; as in the case of a bastard born in a place by collusion; after the order of removal is made out; in removing; after the removal, and before the appeal; in a state of vagrancy; in a house of correction or prison; and in a house of industry or lying-in hospital. A bastard born under a certificate is settled where born; unless the certificate undertakes to provide for the woman and her child, she being then pregnant of a bastard, in which case the child is settled in the certificated parish. But with regard to legitimate children, though the place of birth be *prima facie* the settlement, yet it is not exclusively so; for there are, 2. Settlements by *parentage*, being the settlement of one's father or mother: all children being really settled in the parish where their parents are settled, until they get a new settlement for themselves. A new settlement may be acquired several ways; as, 3. *By marriage*: for a woman, marrying a man that is settled in another parish, changes her own; the law not permitting the separation of husband and wife. But if a man has no settlement, her's is suspended during his life, if he remains in England, and is able to maintain her; but in his absence, or after his death, or during (perhaps) his inability, she may be removed to her old settlement. The other methods of acquiring settlements in any parish are all reducible to this one, of *forty days' resi-*

dence therein; but this forty days' residence (which is construed to be lodging or lying there) must not be by fraud, or stealth, or in any clandestine manner, but accompanied with one or other of the following concomitant circumstances. The next method, therefore, of gaining a settlement is, 4. *By forty days' residence and notice*. For if a stranger comes into a parish, and delivers notice in writing of his place of abode, and number of his family, to one of the churchwardens or overseers (which must be read in the church and registered), and resides there unmolested for forty days after such notice, he is legally settled thereby. (13 & 14 Car. II. cap. 12. 1 Jac. II. cap. 17. 3 & 4 W. & M. cap. 11.) But there are also other circumstances equivalent to such notice: therefore, 5. *Renting* for a year a tenement of the yearly value of 10*l.* and residing forty days in the parish, gains a settlement without notice. (13 & 14 Car. II. c. 12.) 6. Being charged to and paying the public taxes and levies of the parish, excepting those for scavengers, highways, house, and windows. (9 Geo. I. c. 7. 21 Geo. II. c. 10. 18 Geo. III. c. 26.) And, 7. Executing, when legally appointed, any public parochial office on a man's own account for a whole year in the parish, as churchwarden, &c. are both of them equivalent to notice, and gain a settlement, if connected with a residence of forty days. (3 & 4 W. & M. c. 11.) But no settlement shall be gained by any person being charged with and paying his share of the public taxes or levies, in respect of any tenement under the yearly value of 10*l.* (35 Geo. III. c. 101.) By the same act no settlement can be gained by delivery of notice. 8. Being *hired* for a year, when unmarried and childless, and *servng* a year in the same service; and 9. Being bound an *apprentice* for seven years, give the servant and apprentice a settlement without notice, in that place in which they serve the last forty days. (3 & 4 W. & M. c. 11. 8 & 9 W. III. c. 10. 31 Geo. II. c. 11.) By 12 Ann. st. 1. c. 18, a person who serves as a hired servant with one who came and resided in a parish by means or licence of a certificate, without afterwards gaining a legal settlement in such parish, shall not gain a settlement, by reason of such hiring or service: and by 33 Geo. III. c. 54, no person who is servant or a certificated member of a benefit society shall gain a settlement by hiring and service. 10. Lastly, the having an *estate* of one's own, and residing thereon forty days, however small the value may be, in case it be acquired by act of law, or of a third person, as by descent, gift, devise, &c. is a sufficient settlement; but if a man acquire it by his own act, as by purchase (in its popular sense, in consideration of money paid), then, unless the consideration advanced *bona fide* be 30*l.* it is no settlement for any longer time than the person shall inhabit thereon. 9 Geo. I. c. 7.

All persons, not so settled, may be removed to their own parishes on complaint of the overseers, by two justices of the peace, if they shall adjudge them likely to become chargeable to the parish into which they have intruded; unless they are in a way of getting a legal settlement, as by having hired a house of 10*l. per. annum*, or living in an annual service; for then they are not removeable. And in all other cases, if the parish to which they belong will grant them a certificate, acknowledging them to be their parishioners, they cannot be removed, because likely to become chargeable, but only when they become actually chargeable. But such certificated persons can gain no settlement by any of the means above-mentioned, unless by renting a tenement of 10*l. per annum*, or by serving an annual office in the parish, being legally placed therein; neither can an apprentice or servant to such certificated person gain a settlement by such their service. (8 & 9 W. III.

c. 30. 12 Ann. ft. 1. c. 18. 3 Geo. II. c. 29.) If such persons as are removeable shall refuse to go, or shall not remain in that parish where they ought to be settled, but shall return of their own accord to the parish from which they were removed, the justice may send them to the house of correction, there to be punished as vagabonds. (13 & 14 Car. II. c. 12) And by the 17 Geo. II. c. 5. all persons who shall unlawfully return to such parish or place from whence they have been legally removed by order of two justices, without bringing a certificate from the parish or place whereunto they belong, shall be deemed idle and disorderly persons; and any one justice may commit them (being thereof convicted before him, by his own view, or by their own confession, or by the oath of one credible witness) to the house of correction, there to be kept to hard labour for any time not exceeding one month. And if the churchwardens and overseers of the parish to which he shall be removed, refuse to receive such person, and to provide work for him, as other inhabitants of the parish; any justice of that division shall bind any such officer in whom there shall be default to the assizes or sessions, there to be indicted for his contempt in that behalf. (13 & 14 Car. II. c. 12.) And by the 3 W. c. 11. if any person be removed by virtue of this act, from one county, riding, city, town corporate, or liberty, to another, by warrant of two justices; the churchwardens or overseers of the poor of the parish or town to which the said person shall be so removed, are required to receive the said person: and if he or they shall refuse so to do, such person so offending shall (on proof thereof by the oath of two witnesses before one justice of the place to which the person shall be removed) forfeit for each offence 5*l.* to the use of the poor of the parish or town from which such person was removed, to be levied by distress, by warrant to the constable of the parish or town where such offender dwells; and for want of sufficient distress, the said justice shall commit the offender to the common gaol for forty days. By 35 Geo. III. c. 101. so much of the said act of 13 & 14 Car. II. c. 12. as enables justices to remove persons that are likely to become chargeable, is repealed. And it is enacted, that after the 22d of June 1795, no poor person shall be removed from the parish or place where he shall be inhabiting, to the place of his last legal settlement, until he shall have become actually chargeable to the parish, township, or place in which he shall then inhabit, in which case two justices may remove such person, in the same manner, and subject to the same appeal, and with the same powers, as might have been done before the passing of this act, with respect to persons likely to become chargeable. Provided always, that every person who shall have been convicted of larceny, or any other felony, or by the laws now in being deemed a rogue, vagabond, idle or disorderly person; or who shall appear to two justices where such person shall reside, upon the oath of one witness, to be a person of evil fame, or a reputed thief, such person not being able to give a satisfactory account of himself, or of his way of living; shall be considered as a person actually chargeable within the meaning of this act to the parish where he shall reside, and may be removed to his place of settlement by order of the said justice. Provided also, that every unmarried woman with child shall be deemed and taken to be a person actually chargeable to the place where she shall inhabit, and may be removed as such to the place of her settlement. This act supercedes the necessity of granting certificates.

These are the general heads of the laws relating to the poor, which by the resolutions of the courts of justice thereon, within a century past, are branched into a great

variety. And yet notwithstanding the pains that have been taken about them, they still remain very imperfect, and inadequate to the purposes for which they are designed.

When the shires, the hundreds, and the tithings, were kept in the same admirable order in which they were disposed by the great Alfred, there were no persons idle, consequently none but the impotent that needed relief; and the statute 43 Eliz. seems entirely founded on the same principle. But when this excellent scheme was neglected and departed from, we cannot but observe with concern, what miserable shifts and lame expedients have from time to time been adopted, in order to patch up the flaws occasioned by this neglect. There is not a more necessary or more certain maxim in the frame and constitution of society, than that every individual must contribute his share, in order to the well-being of the community; and hereby they must be very deficient in sound policy, who suffer one-half of a parish to continue idle, dissolute, and unemployed; and at length are amazed to find, that the industry of the other half is not able to maintain the whole. Blackst. Comm. book. i. For a variety of cases and arguments relating to the settlement, removal, &c. of the poor, see Burn's Justice, art. *Poor*.

The author of the Present State of Husbandry in Great Britain, considers the poor laws and poor rates scarcely less oppressive to the farmer, or injurious to the interests of agriculture in England, than the tythes.

In speaking of them, he says, those most impolitic of all impolitic laws, were unquestionably established on principles and from motives that do honour to the feelings of the legislative body of the time in which they were enacted. They were considered, not only by those who framed and supported them, but by all sensible and intelligent people, as the wisest and most philanthropic of human institutions. They had for their chief object the comfortable subsistence of those who, feeble through age or misfortune, were rendered incapable of exerting themselves in such a manner as to procure from their labour a sufficient supply of the necessaries of life; and that by means the most rational, namely, by compelling those who possessed none, or but a small share, of "the milk of human kindness," to contribute in an equal proportion with those who, from liberal and benevolent dispositions, would have continued to do so without legal compulsion. It was expected, that the enacting of these laws would have had the effect of introducing a spirit of industry among the lower ranks; which, while it tended to render the operation of the poor laws in a very small degree burthensome to the wealthy part of the community, would also have greatly promoted the prosperity of the nation. But how blind, says he, is human foresight, and how imperfect all human institutions! These laws, from the establishment of which so many happy effects were expected to result, have tended to consequences of the most alarming nature; consequences which, if effectual measures are not speedily taken to avert them, may and probably will end in universal ruin. That something is necessary to be done in respect to these laws, the late rapid increase of the rates sufficiently shews. It is further remarked by the above writer, that it is stated in Kames's Sketches of the History of Man, "that in Dr. Davenant's time the poor's rates were about 700,000*l.* annually. In 1764 they amounted to 2,000,000*l.* In 1773 they amounted to 3,000,000*l.*, equal to six shillings in the pound land-tax." So that if they have increased in an equal ratio since the year 1773, which will not be denied, they cannot, he says, in 1796, be less than 5,000,000*l.*, equal, by the above calculation, to ten shillings in the pound land-tax. That this is the case there can be little doubt, though

the sum would seem to be a great deal more than would maintain all the poor of the kingdom under proper management. The increase, however, has been still greater since the last of these periods.

But it is added, that notwithstanding the enormous assessments to which they give rise, they are by no means attended with the advantages which were expected. In place of tending to improve the morals or increase the industry of the poor, they have had, he says, quite a contrary effect. It was but a short time after the enactment of these laws that the public were, he observes, insulted with the famous song of

“ Hang sorrow, cast away care,
The parish is bound to maintain us.”

And how much this sentiment seems to be impressed on the minds of the generality of that description of people for whose benefit these laws were framed, is well known to all who live under their influence. They require not to be reminded how necessary it is become to endeavour, by every possible means, to curb that spirit of licentiousness which so generally reigns within the walls of a parish workhouse; whence shame, honesty, and pride seem to be for ever banished. And Mr. Middleton, in his able Survey of the County of Middlesex, after observing that agriculture occasions very few poor, — on the contrary, it provides them almost constant labour, — remarks, that it is only the blind, the extreme old, the very young children and idiots, which become chargeable in a parish purely agricultural. He thinks that a labourer in agriculture is more likely to support his family without assistance from the parish, at twelve shillings a week, than is a journeyman in any large manufactory, though his earnings should be a guinea, or a guinea and a half. But, says he, large manufactories, like crowded workhouses, destroy every virtuous principle. Such situations are the very sinks of vice; the old and the young, the healthy, and those afflicted with loathsome diseases, the necessitous and the abandoned, are all mixed in one house, or perhaps in one room. Here the young, the unfortunate, and persons of weak, yet honest minds, every minute have their ears assailed with infamous oaths, and descriptions of every species of vice, deception, and theft. The scene is in the highest degree horrid, and infinitely surpasses any powers of description. It is added, that the idea of supporting a large family at a less expence *per* head than a small one, has led us into sad extremes. The supporters of such a system neglected to estimate the effect of that general contamination of morals, which always takes place in situations crowded with paupers of every description; as well as the impossibility of preventing frauds and of effecting the most prudent management, in large workhouses, or houses of industry, such, in short, as in the end to have the effect of more than doubling the expence; and which is calculated to be perpetually increasing, in something like the proportion of compound interest. In support of this, he further remarks, that the difference in favour of small or thinly inhabited parishes, when put in comparison with such as are large and populous, as to the expence and orderly behaviour of their poor, is astonishingly great. Hence the latter should divide and subdivide their poor, in order to put them on the advantageous terms of the former. And he justly thinks, that all the really necessitous, and who only want a part of their support, should be assisted in their own houses, where five shillings will frequently go as far as twenty would do in the workhouse. He adds, that the Rev. John Howlett, speaking of the means used for lowering the poor-rates in his parish of Dunmow, in the county of Essex, attributes it to two causes: first, a determination in

the parish officers to spare their money to the utmost; and, secondly, by admitting as few as possible into the workhouse, where experience had taught them, that the maintenance of the poor is much more expensive than out of it. The consequence was a very large decrease in the rates. This is a strong fact, which deserves the particular attention of the farmer and land proprietor of every district.

Mr. Middleton thinks, that for distressed objects who of necessity must have the whole of their support from the parish, there should be a sufficient number of small cottages built, in lieu of a workhouse, not all close together, but perhaps in pairs, or at least so much apart, as to admit of each cottage having a piece of ground for the production of potatoes, turnips, &c.; if widely dispersed over several parts of the same parish, so much the better; they should be made to hold two persons, and one or two children, or in lieu of the children, one or two of those paupers who should be found the most infirm. They should be obliged to assist each other, and to do something towards their own support. Alms-houses are, he says, a case in point, where poor persons live, on an average, for half the expence that supports others in a workhouse, which incontrovertibly shews the more cheap and superior comforts which cottages afford over workhouses, and likewise the wisdom of erecting them in lieu of workhouses for the reception of the poor. Many instances of this sort are to be found.

He contends, that they who are able to work, but who are idle and incorrigible, should be let out to persons who are in the habit of employing and supporting such characters; or they might be committed to the house of correction. And in many cases paupers might, he thinks, be employed in scraping the turnpike roads and highways. The overseers should undertake the work by contract, which would be a benefit to the parish, and a convenience to the public.

And it is strongly stated, that lodging and diet in the workhouses, in every instance, are superior to what the industrious labourer can provide for his family. It is obvious, he says, that this must have an influence over their minds, and become most injurious to the interests of society. It holds out encouragement to prefer the workhouse to labour; and, by filling the poor-houses with improper inhabitants, it reduces the amount of industry. In this county, in those parishes with which he is acquainted, the annual expence of each pauper is about fifteen guineas; a stout healthy labourer in husbandry, with a wife and three children, earns only thirty for the support of five persons; and that the earnings of the inhabitants of workhouses, on an average of the whole of the county, do not amount to eight shillings *per* head *per annum*; which taken from the former sum, leave fifteen pounds seven shillings, or near six shillings a week, as the expence of supporting each pauper. This is a profuse expenditure of parish money, as two-thirds of the whole number of persons would support themselves out of the house, on being allowed only two shillings a-week each. If it be true, he says, that two-thirds of the number can be supported for two shillings a-week in their own houses, the whole might, in that case, be maintained for half the expence incurred under the present system. Nor ought they in any case to be allowed so much as one-fifth of the earnings of a labourer, otherwise their situation is made as good or better than his. This is a point that ought to be well considered by the managers of parishes, where the workhouse system prevails.

He concludes by well observing, that every institution which tends to make the poor depend on any other support than their own industry, does them great disservice, and it is highly

highly injurious to society, by diminishing the quantity of labour which annually produces consumable goods, the only wealth of a nation.

It is only necessary here to consider these laws as they affect agriculture. And it is contended by Mr. Donaldson, that from no alteration having been made in regard to the species of property assessable in virtue thereof, although they might have been considered equitable at the time they were enacted, they have, in consequence of the alteration of circumstances that has gradually taken place, become almost intolerably oppressive on the landed interest; while the merchant, the manufacturer, and the monied man, are either entirely exempted, or but in a very small degree affected. In short, poor's rates, according to the present establishment, are, he supposes, the most partial tax that ever was levied in this or in any other country. He well remarks, that in the days of queen Elizabeth, when poor's rates were first established, the commerce and manufactures of England were in their infancy, and three *per cents.* India bonds, exchequer bills, scrip, omnium, &c. were unknown. That being the case, permanent property only, as the rents of lands and houses, could fall under the view of the then legislators as subject to assessment. Hence the reason why these laws, which, as formerly observed, may be supposed to have been arranged on equitable principles, according to the state of matters at the time, have now become an engine of oppression against two descriptions of people,—the proprietors of land and farmers. That this is the case, is obvious, he thinks, on the most cursory view of the subject. The poor's rates, for instance, in the parish of Kettering, in the county of Northampton, were last year (1795) at fifteen shillings in the pound of rack rent. And he has been informed, that, in the city of Norwich, the poor's rates were the same year at twenty-four shillings in the pound; that is, while the tenant paid twenty pounds to his landlord, he was obliged to pay twenty-four pounds towards the maintenance of the poor. The cause of so high an assessment was, as may easily be supposed, owing to the failure of the manufactures in consequence of the war.

Suppose, therefore, that a proprietor in the former parish was entitled to receive 1000*l.* of rent from his tenants, they would at the same time have to pay to the overseers of

£.	s.	d.
750	0	0

Suppose, further, that a merchant, manufacturer, or stock-holder, residing in the same parish, had a clear annual revenue of 1750*l.* arising from the profits of trade, or the interest of money in the funds, he would probably possess houses at an established rent of 60*l.* a-year: in which case his assessment for the maintenance of the poor would amount to

45	0	0
Difference	705	0 0

From this, he thinks, it appears, that the land-owner possessing an estate of the value of 1000*l.* a-year, pays upwards of 700*l.* towards the support of the poor beyond what could be legally demanded from the merchant, the manufacturer, or the stock-holder, under similar circumstances, in regard to the extent of funds. Were the land-holders the only persons that suffer by this partial, and consequently oppressive tax, it would not be generally regretted; as it is well known, he says, that it is to their supineness in not applying to the legislature for an alteration of the existing poor's laws, that the evil has arrived at such a height, and that such heavy

assessments are rendered necessary: but the farmers, unfortunately, are also sufferers, and owing to the concurrence of several causes, frequently to a very considerable extent. In the instance mentioned of the parish of Kettering, the poor's rates, previous to the commencement of the war, did not, he says, exceed 5*s.* in the pound; so that from that period, and during its continuance, a tenant paying 100*l.* a-year rent to his landlord, has to pay 50*l.* of additional poor's rates, and that, whether he possesses his farm under lease or at the will of his landlord. If the farm be held under lease for a term of years, the tenant can have no recourse to the landlord, who generally stipulates that he shall pay all parish-taxes. If, on the other hand, it be held from year to year, the tenant is, from that circumstance, so dependent on the proprietor, that he dare not make the least objection against paying the additional assessment, from an apprehension of being turned out of his farm, and thereby deprived of the means of providing for his family. The proprietors, therefore, pay only the ordinary poor's rates, the tenants being subjected in payment of such as are rendered necessary in consequence of the nation being at any time engaged in war, or that a stagnation of paper credit, or any other circumstance occurs whereby the manufacturers are interrupted. While, says he, the manufacturers can promote their own interest by employing the labouring class of the people, they do so; but when they perceive they can no longer benefit themselves, they send them to their different parishes, to be maintained at the farmer's expence till the return of peace, or other favourable circumstances occur, to create a new demand for manufacturing labourers. He further states, that Mr. Marshall, in the first volume of his Rural Economy of the West of England, mentions, as an evidence of the mischief which manufacturers are capable of entailing on agriculture, that a woollen manufacture was some time ago set on foot at Modbury, and carried on with spirit and with success to the individuals who prosecuted it: but their end being answered, the manufacture ceased, and all the vice and debility which it had drawn together were left a load upon the parish. The consequence of which is, the occupiers of land within the township of Modbury are now paying five shillings in the pound to the poor, while those of the surrounding parishes do not pay two shillings. Numerous instances of this sort might be mentioned to prove, that while the manufacturers pocket all the profit that can be derived from employing these people in prosperous times, they consign them to the farmer's charge the moment the wages which they choose to give are inadequate to their maintenance, or when they, the manufacturers, cannot profit by continuing them in their service.

On this subject, it is further observed, there is another circumstance that requires to be mentioned as productive of many evil consequences, namely, that which regards the gaining a settlement in a parish. It is well known how much superior the situation of all ranks of people in this country is to that of those in some parts of the continent of Europe; particularly in Russia, where the peasantry may, he says, be considered as appendages of the soil, being doomed to cultivate a particular tract of land, whoever becomes the proprietor. It is, he says, with regret that he mentions, that a species of slavery exists in England nearly of the same nature with that. Can, says he, that country be called free where the great body of the people are bound to reside in the particular spots where they were born? Yet this is certainly the case in England. The peasantry of the present day are bound by laws, enacted long before they were born, to confine themselves to their own parish; and if perchance they emigrate to a strange

county, although perhaps only to the adjoining parish, they are not only prevented from exercising the rights of citizens; but when there is the least prospect of their becoming burdensome to the inhabitants, they are hunted home like a parcel of strayed cattle or sheep that had overleaped the inclosures in which they were confined. Why not, he asks, permit the poor to seek a livelihood wherever work offers, or inclination leads them? In place of being subjected to be taken up as vagrants, if found out of their own parish, a parish in which they cannot find employment; would it not be for the interest of the community were they permitted to go where they could render essential service to the public, and where they have a certainty of supporting themselves and their families, without being reduced to the necessity of making a mortifying application to an unfeeling parish officer? Were such an alteration to take place, both the rich and the poor would, he thinks, experience the benefit. But while the laws of parish settlements remain on their present footing, let Englishmen, while they boast of the liberty they enjoy, reflect on these, and they will find that they accord not with genuine liberty: that wherever such laws are in force, rational liberty must be considered as in shackles.

It is strongly contended, that while this order of things remains, while the manufacturers shall continue in a great measure exempted from contributing towards the expence of maintaining those people who have become old and infirm in their service; while the farmers are subjected to such heavy exactions on every interruption to which the manufactures of the country are liable, agriculture must remain in a languid state, and the spirit of the farmer continue depressed.

The same writer then takes a view of the method of management in respect to the poor in Scotland, in order to shew, in how small a degree the expence of their maintenance affects the agriculture of that country. It is stated, that the sum necessary to maintain the poor in any particular parish in Scotland, especially in the country, amounts only to a few pounds in the year; which may be accounted for by stating the simple manner in which they live; oat-meal cooked in various ways, and potatoes, being their principal food. When reduced, by unforeseen accidents, or old age, to have recourse to the parish for relief, they are satisfied with a very small sum, two or three shillings in a month; asking in charity, what their neighbours in the same class in England demand as a matter of right. Indeed, says he, few but such as are destitute of relations able to support them make the application; it being considered disgraceful, both to themselves and their relations, to have their names entered on what is called the *poor's roll*. And, he adds, that the money necessary for the support of the poor is, for the most part, made up of voluntary contributions from the more wealthy inhabitants, which take place every Lord's day, before or after divine service. But, that there is also an old Scotch act of parliament still in force, by which the proprietors and tenants are liable to be assessed equally in such additional sum as may be judged necessary to support the poor of each parish: but this act is very seldom put in force, except in large towns, or in those parishes in the neighbourhood of the mountainous parts of the country, where the greatest number of poor people reside. He observes, that the slavish law of parish settlement is unknown in Scotland; the labouring poor, like the rich, are at liberty to settle where they can dispose of their time, or their talents to the best advantage. Should a poor family, after having received supply from the funds of the parish in which they reside, remove to another, that parish in which they formerly resided, in some cases,

supply their necessities for two or three years after their removal; at the expiration of which period, they become entitled to receive a share of the funds of that parish in which they are resident. But although this regulation has, it is believed, the sanction of the law, there are, he says, very few instances where it becomes necessary to enforce it. It is therefore contended, that the maintenance of the poor in Scotland cannot be said to be oppressive to any class or description of the inhabitants. It is, however, remarked, that a disposition to encourage the introduction of poor's laws, appears to evince itself in many parts of that kingdom. A pound rate is, he says, already established in Berwickshire; 3*d.* or 4*d.* on the acre of improved land is payable by the farmers; and in many country parishes in other districts, yearly assessments are made. Should the negligence of the proprietors to the situation of the poor, be the means of rendering the establishment of additional poor's laws necessary, their conduct must be considered by every thinking person as reprehensible to the highest degree. The existing laws are fully sufficient for the purpose of securing the means of subsistence to the industrious poor, by their being at liberty to continue to reside in the place where they had spent the active part of their life: after they are able no longer to procure themselves the necessaries of life by the labour of their hands, the manufacturers are compelled to contribute more liberally to their relief than if, under the authority of laws of settlement, the manufacturers, or mercantile, or monied people, residing in towns, had it in their power to order them, in the decline of life, when their period of labour is for ever past and gone, to the parishes in the country in which they were born. The writer strongly addresses the proprietors of Scotland ever to consider the situation of England, in consequence of establishing impolitic poor's laws as a warning to them against any innovation of that nature. And that, while they study that the poor in Scotland shall pass the remainder of their days without ever having to apprehend the fear of want; that they never make such an establishment as can tend, in any degree, to render morality and industry empty names.

The writer of the Scots Farmer has introduced some very strong remarks on the mischievous tendency of the present poor's laws. In speaking of the mode of levying taxes for the support of the poor, and the method in which they are maintained, he says he is for doing good to the poor, but he differs in opinion about the means. He thinks the best way of doing good to the poor is, not making them easy in poverty, but leading or driving them out of it. In his youth he travelled much, and he observed in different countries, that the more public provisions were made for the poor, the less they provided for themselves, and, of course, became poorer; and, on the contrary, the less was done for them, the more they did for themselves, and became richer. There is no country in the world, he says, where so many provisions are established for them; so many hospitals to receive them when they are sick and lame, founded and maintained by voluntary charities; so many alms-houses for the aged of both sexes, together with a solemn general law made by the rich to subject their estates to a heavy tax for the support of the poor, as in England. Under all these obligations, he asks, are our poor modest, humble, and thankful? and do they use their best endeavours to maintain themselves and lighten our shoulders of this burden? On the contrary, he affirms, that there is no country in the world in which the poor are more idle, dissolute, drunken, and insolent. In addressing himself to the public, he says, the day you
passed

passed that act, you took away from before their eyes the greatest of all inducements to industry,—frugality and sobriety—by giving them a dependence on somewhat else than a careful accumulation during youth and health, for support in age and sickness. In short, says he, you offered a premium for the encouragement of idleness, and you should not now wonder that it has had its effect in the increase of poverty. Repeal that law, and you will soon see a change in their manners. Saint Monday and faint Tuesday will soon cease to be holidays. Six days shalt thou labour, though one of the old commandments, long treated as out of date, will again be looked upon as a respectable precept. Industry will increase, and with it plenty, among the lower people. Their circumstances will mend, and more will be done for their happiness, by inuring them to provide for themselves, than could be done by dividing all your estates among them.

These remarks deserve the fullest consideration of the landed proprietors and farmers of this country, and it is sufficiently obvious, from the rapid increase of such rates, that material alterations must soon necessarily take place in regard to the objects of taxation, as well as in respect to the modes in which the money levied is expended. At present it is conceived that a system of peculation is established, in too many instances, among those whose province it is to expend the money so levied for the purposes to which the law directs it should be applied. The shameful expence of litigations between parishes, respecting the settlement of individual paupers, and the extravagant charge often incurred in transporting them from one parish to another, according to the present system, is often so great, as to add very considerably to the sum total necessary to be levied on the industrious and opulent inhabitants. There is likewise much other mismanagement both in the system of work-houses, as fully shewn above, and in that of the regulations in respect to the expenditure of the money, which should be attended to in making such alterations as from the change of circumstances now become necessary in supporting the poor.

It is stated in a very forcible manner, in the Cheshire Corrected Agricultural Report, that, from the great increase which has, of late years, taken place in the number of the poor throughout the kingdom, there certainly seems too much reason to believe, that the measures which the system of the poor laws involves, are, to say the least of them, incompetent to the ends they have in view; and that there exists a necessity for adopting, and pursuing with vigour, others which are more efficient and salutary. Whatever may be the advantages derived from the existing laws, the positive evils which they produce are but too apparent. They have a direct tendency to annihilate the spirit of honest independence amongst the lower classes of the community; to take from them the strongest stimulus to industry; and by affording a refuge to the idle, the profligate, and the abandoned, to contribute greatly to the extension of every species of vice and immorality. That some provision must be made in every community for the aged and infirm among the lower classes, is, it is said, a position concerning which no doubts can possibly be entertained. This provision the poor laws in England certainly do make; but by a mode of operation, according to the opinion of many intelligent individuals, defective in so many respects, as to render an alteration of the system a measure sincerely to be desired by every person who wishes well to the interests of his country.

These useful remarks are further enforced by the insertion of the following communication from J. T. Stanley,

esq., a most active and intelligent magistrate of the same county, whose situation has afforded him every opportunity of making observations on the subject.

“The poor rates,” says he, “will in a short time alter the whole character of the English nation: they promote an enmity between the land occupiers and the poor, which makes every township a scene of warfare. The poor, and particularly the wicked and idle, demand dwellings, cloathing, fire, and a weekly pension as their right; and by insolent importunity obtain them. The industrious honest labourer cannot be said to have one advantage in point of comfort over the man who lives in the alehouse, and suffers his children to run wild over the commons. The overseer must relieve all who have wants; and the magistrate, should he hesitate, must order him to do so. The facility of being maintained destroys every stimulant to exertion; and honestly having no advantage, the rogue laughs at the honest man. Debauchery, drunkenness, petty thefts, and perjury, are increasing with rapid strides; and the expence of prosecutions leaves the common people in the secure enjoyment of their licentiousness. The wicked, from their numbers, are absolutely become powerful; no magistrate can now attempt to put in force any of the old laws respecting small offences. The pillory, the stocks, and all means of inflicting moderate punishment, are laid aside; and imprisonment in the public gaols alone is resorted to, which always adds to the depravity of the offender.

“If there was an earnest desire in the legislature to remedy the evil, many modes might be pointed out; but no half measures would do any good. The evil is of great magnitude, and every day renders its cure more difficult; because the number of those who would suffer by a vigorous law affecting the idle, is increasing. Whatever the law is, it should be imperious; and the overseers should be allowed no choice in the distribution of their charities. They should be compelled to find work for the idle, and not suffered to give them money. For the maimed and the sick there should be public hospitals. There should be punishment for the depraved: and magistrates and constables should be armed with a power that could reach petty offences. No woman ought to have a right to call on the public for the maintenance of an illegitimate child, without suffering some punishment for her misconduct. More should be left to private charity than is at present. Indeed, who now will give money to relieve distress, which, if charity does not, the law must relieve? Charity now only goes in aid of the poor rate; and whoever maintains a poor labourer or sick widow, exempts his neighbour from a portion of their tax.”

It has been suggested from another quarter, that it would tend much to allay the public clamour of the increasing expence of the poor, and would promote the ends of private justice, if the poor rates were universally assessed according to the real value of the land or property, to be taken without prejudice or partiality by sworn parochial commissioners, every seven years; as we know that estates are frequently doubled in rent, while the nominal assessed rate remains the same. And also, if the same sort of rate was equally applied to other kinds of property which at present pay nothing towards this very heavy and increasing expence.

In short, the writer of the Berkshire Report on Agriculture is sure, that if half the trouble and expence were incurred to prevent poverty which are taken to relieve it, the lower orders would be infinitely more comfortable, than experience and observation convince us they are. “Labour,”

says

says he, "according to doctor Adam Smith, is the fund which originally supplies a nation with all the necessaries and conveniences of life which it consumes." If this position, which appears incontrovertible, he adds, applies to a period antecedent to civilization, it must be admitted, that when social and civil order was established, the triple union of *land, flock, and labour*, formed the basis of every valuable possession. It is in vain that the proprietor of land boasts of the extent of his domains, if no one will till the soil; or that the merchant or manufacturer commands stock, without hands to render it productive. The importance of labour is thus established without further argument; and though in every well regulated society, they who possess hereditary or acquired property will always be secured in their rights, and in consequence of those rights will be entitled to the enjoyments they confer, it must be allowed, that they who labour with a proper degree of diligence, ought likewise to acquire the necessaries of life by their own industry; and not be rendered dependent on others, or become a tax on the bounty of their employers. Since the poor laws, however, were established, however humane and judicious in their first institution, by affording a certain provision for infancy and age, we find pauperism has been continually increasing, and that with growing wealth, the labouring poor have become more and more numerous and depressed. The law of settlement, the restrictions on the amount of wages, and, above all, the inadequacy of wages in agriculture to support a family, have created and kept up that enormous mass of ills, which is equally distressing and disgraceful. In consequence of this, the labouring poor too frequently lose the pride of independence, as is evident from the state of Scotland, the best guardian of every moral virtue; and finding it in vain to struggle with their fate, become careless and improvident, clamorous and dissatisfied. They are more ready to demand their legal rights from the parish to which they belong, than to perform their proper duties; and thus give a colour to the injurious imputations which are cast upon their conduct and principles. The characters of men are influenced by circumstances, and are formed by habits; and the only effectual means, in his opinion, of ameliorating the condition of the labouring poor, and of giving them honourable feelings and impressions, is to assist and direct their endeavours in the path of independence.

The first step, it is conceived, is to render their cottages comfortable, and to give them an interest, if possible, in this kind of property, which is dear to every mind not wholly lost to sensibility and reflection. Nothing would more tend to make men good labourers, good husbands, good fathers, and good subjects, than a property in their homes, or an assurance that they would not be dispossessed, except by their own misconduct, with such a portion of land for a garden, &c. as would employ their leisure hours, without drawing them off from their regular engagements. It is wonderful how much may be produced from a small spot of ground, well managed, both for the use of families and for sale, as is evinced by numerous instances.

And next to the comforts of a residence, to which he would wish the poor to be attached by interest as well as choice, it seems necessary to teach them the value of property, and to point out the way by which it may be acquired. The duty that survives hope will seldom be performed with energy or effect. While the wages of a labouring man are perhaps only nine shillings a week, except when he works by the great, if he has a family too young to assist his endeavours, it is wholly impossible that he can support himself and them; and, therefore, instead of being more

frugal and economical, he becomes indifferent about expence; instead of seeking resources in industry, he tries to bury reflection in the dissipation of the ale-house; and weary of struggling with fortune, sinks into a parish pauper, and loses the dignity of a man. It must, however, be admitted, that with a large family, no fair and reasonable wages will enable a labourer to acquire even the bread necessary to support life; and therefore, in addition to his daily or weekly pay, it will be requisite to give him an interest in some fund, on which he can draw without shame, and without the humiliating sense of obligation. For this purpose, parochial friendly societies should be established, to which every servant and labourer should be obliged to contribute, without regard to sex, on arriving at an age when they can provide for themselves; and to continue subscribing till the age of sixty, even if they should be drawing largely from the fund, to which they are contributing only in a small degree.

Further, and in order to render this adequate to the demands arising from ill health, or an increase of family, and other incidentals, the proprietors of land and houses should be invited to join the society, and the occupiers of both assessed in fair proportions, according to the necessary expence; while those not chargeable to church and poor, should in no case be obliged to pay more than their regular subscription. It would likewise be a judicious regulation, to allow pecuniary premiums, or honorary distinctions, to such labouring people as brought up children to the age of fourteen, respectively, without claiming any aid from the fund, except during illness, or when they were thrown out of employment; and when a man had laboured with a fair character till he was sixty years of age, he ought to receive, from the same source, a small annuity for life, as a reward for his past services; but not sufficient to keep him idle, if still able to work. In this case, it is supposed, parish rates for purposes unconnected with the poor would alone be required, and poor rates would lose their name. He does not, he says, presume to enter into the details of the plan he has proposed, to effectuate the object of doing away poor rates, as he is aware that legislative provisions would be necessary, and that the system must receive more attention to perfect it than he can bestow; but should it only be adopted to a limited degree, as far as establishing a friendly society, according to the common acceptation, in every parish, or in every two or three adjoining parishes, where the population is small, he is deeply impressed with the benefit that would result from it; particularly if the proprietors and occupiers of land were to become honorary members, and to countenance the society by attending their meetings, and assisting to regulate their affairs. Double the ordinary subscription, and disclaiming any demands on the fund, would be sufficient to constitute an honorary member; and the sum thus applied would be more than saved to parishes during the illness of the poor, or their incapacity to work. But it is not to a saving only that he confines his views; it is a principle of independence he wishes to establish, of more value in its consequences than any immediate diminution of expence.

It is observed, that there are various regulations of a subordinate nature, which might be grafted on the present system, and which would all, more or less, tend to promote the independence and comfort of the poor. Premiums might be proposed for such persons as had reared families of three or more children to maturity, without parochial relief; and an annuity on the approach of age, for an industrious and regular life, would at once be a stimulus and reward. He would likewise recommend, that labourers in agriculture

should be paid any part of their wages that was agreeable to themselves, in flour, barley, or other grain, at the lowest market price, and in any quantity required. This would at once check improvidence, and promote comfort. There might also, it is suggested, be regulations made for providing them with milk, beer, and other necessaries, and above all for proper education and instruction.

POOR, or *Power*, in *Ichthyology*, a name given by the people of Cornwall to a species of bearded gadus. This is the gadus minutus of Linnæus, and is the only species of cod-fish with three dorsal fins that is found in the Mediterranean sea. It is taken in great quantities near Marseilles, and esteemed good, but incapable of being salted or dried. Its length is little more than six inches. See **GADUS**.

POOR man's pepper, in *Botany*. See **DITTANDER**.

POORALEE, in *Geography*, the ancient *Arabijs*, a river of Persia, in the district of Lus, which rises in the mountains near Bayla, the capital of Lus, and running in a S.E. direction, falls into the bay of Sonmany. Bayla, built on its N.E. bank, contains 1500 houses, and 6000 inhabitants, of whom 400 are Hindoos.

POOR-BUNDER, a town of Hindoostan, on the coast of Guzerat; 56 miles N.W. of Puttan Sumnaut.

POOR-KNIGHTS, a cluster of islands in the South Pacific ocean, near the N.E. coast of New Zealand. S. lat. $35^{\circ} 30'$. E. long. $174^{\circ} 42'$.

POOROONDER. See **POONAH**.

POORUP, a town of Hindoostan, in Oude; 30 miles N.E. of Bareilly.

POORVAH, a town of Hindoostan, in Oude; 20 miles S. of Lucknow.

POOSHAU LAKE, a lake of America, in the county of Hancock, and province of Maine, which communicates by a river with Penobscot bay.

POOSPANSCUM, in *Natural History*, the name of a peculiar species of fossil in the East Indies. It is of the nature of the blende, or mock-lead, with us; but it is not formed into so large flakes, but more resembles the steel-grained lead ores. It is found in the beds of rivers, and when calcined, it is used with the juices of certain herbs, for ulcers and other cutaneous disorders. Before calcination it is also used by the women to make their hair of a fine glossy black colour, which it performs very neatly.

POOSTOLE, in *Geography*, a small circar of Bengal, bounded on the N. and W. by Dinagepour, on the E. by the Moosheda, and on the S. by Bettooriah.

POOTEWATOMIES, Indians of America. N. lat. 42° . W. long. 81° .

POOTGAUT, a town of Hindoostan, in the circar of Sumbul; 10 miles N.W. of Sumbul.

POOTI, a river on the E. coast of Sumatra, which runs into the sea of Java, S. lat. $4^{\circ} 38'$. E. long. $105^{\circ} 45'$.

POOTLAPASSA, a town of Hindoostan, in Tellin-gana; six miles E. of Warangole.

POO-TOO, or **POU-TEOU**, a small island in the cluster of those denominated Chusan islands in the Chinese sea, a little to the E. of Tcheouchan. It is represented as a perfect paradise. It was chosen, without doubt, on account of its natural beauties, and afterwards embellished by a set of religious men, who, in number about 3000, possess the whole of it, living there in a state of celibacy. This small island contains 400 temples, to each of which are annexed dwelling-houses and gardens, for the accommodation of those monks. This large monastery, as it may be called, is richly endowed, and its fame is spread throughout the empire. Staunton's Emb. vol. i.

POOTOOPOOT'OOA, one of the small Friendly islands; 18 miles N. of Annamooka.

POOTYA, a town of Bengal; 10 miles W.S.W. of Nattore.

POOUSOOMSUCK, a river of Vermont, which runs into the Connecticut, in the township of Barnet, N. lat. $44^{\circ} 18'$. W. long. $71^{\circ} 58'$. On this river, which is settled 20 miles upwards, are some of the best townships in the state; the river is noted for the quantity and quality of its salmon.

POPA MADRE, a town of South America, in the province of Carthagea; 50 miles E. of Carthagea. N. lat. $10^{\circ} 3'$. W. long. $74^{\circ} 32'$.

POPACATEPEC. See **ORIZAVA**.

POPACHTON, a town of New York; 38 miles W.S.W. of Esopus.

POPÆ, among the Romans, were such persons as attended the sacrifices, whose business it was to provide victims, and to kill them after they had knocked them down. They were half naked, their shoulders, arms, and upper parts of their bodies being uncovered as far as their navels, and the rest covered to the mid-leg with a linen apron, or the skins of the sacrifices; and they wore crowns of laurel upon their heads. See **SACRIFICE**.

POPAYAN, in *Geography*, one of the provinces of the viceroyalty of New Granada; bordering northward on the province of Carthagea; extending southward to the river Mayo and to Ipiales, where it borders on the jurisdiction of the town of Miguel de Ibarra, and terminating towards the N.E. with the province of Antioquia, the best of its provinces, and contiguous to that of Santa Fé. Its western boundary was formerly the South-sea; but it has in later times been so contracted by the new government of Choco, that the territory of Barbacoas is the only part of it which reaches to the sea; eastward it spreads itself to the sources of the river Coqueta, which are also thought to be those of the rivers Orinoco and Negro. Its extent is not precisely ascertained; but it is probably conjectured, that from E. to W. it is about 80 leagues, and at least as much from N. to S., if not more, some asserting that its length is 110 leagues. It contains many towns and villages, and is divided into several departments, over each of which the principal governor nominates a deputy for the administration of justice. Those which form the government of Popayan, according to Don Juan and De Ulloa, are the following, *viz.* Santiago di Cali, Santa Fé de Antioquia, Las Quatro Ciudades, Timana, Guadalajara de Baga, S. Sebastian de la Plata, Almaguer, Caloto, San Juan de Pasto, El Raposo, and Barbacoas. Of the above-mentioned departments, those towards the N. and E. of the city of Popayan, as Santa Fé de Antioquia, Las Quatro Ciudades, Timana, and S. Sebastian de la Plata, belong to the audience and province of Santa Fé; the others lying near to Quito belong to its province; and those of San Juan de Pasto and Barbacoas are within its diocese. The departments of Cali and Baga, lying between the governments of Popayan and Choco, thrive, as being the channel of the commerce which is carried on continually betwixt those two governments; whereas, it is otherwise with that of Almaguer, from the smallness of its jurisdiction, and its inconsiderable traffick. That of Caloto, the extent of which is greater and its soil fertile, is of course richer; it abounds with the products of the earth, and the country is every where interspersed with farms. The department of El Raposo resembles the two first; that of Pasto is large, but less wealthy; Barbacoas is small, and being scantily supplied within itself, is indebted for provisions of various kinds to other provinces. The temperature of Popayan

popayan is the same with that of Quito, and varies in different places, according to their situation; some parts, and particularly Popayan the capital, enjoy a continual spring. The soil also varies, producing, however, grains and fruits in abundance; and the farms breed great numbers of horned cattle and sheep. The jurisdiction of Popayan is more subject to tempests of thunder and lightning than even Quito, where they are very frequent. This frequency of tempests and earthquakes is supposed to be owing to its great number of mines, in which it exceeds all the other departments within the province of Quito. Caloto is said to be the most subject to such tempests. In the vallies of Neyba, and others within the jurisdiction of Popayan, is a poisonous insect, resembling in shape a spider, and called coya or coyba, of a fiery red colour, the venom of which is extremely malignant. Among the plants of Popayan, in the jurisdiction of Timana, grows the cuca or coca, which is more highly valued by the Indians than the most precious metals or gems. The Indians use it for chewing, after mixing it with a kind of chalk or whitish earth, called mambi. This herb is so nutritious and invigorating, that they labour whole days without any other sustenance. This coca is exactly the same with the betel of the East Indies. In Pasto, one of the most southern districts of Popayan, are trees which yield a resin, called mopamopa; of which is made a varnish of exquisite beauty, which will bear boiling water and even acids. It is used for varnishing the cabinets, tables, &c. made by the Indians, which are carried to Quito, where they are highly valued.

Popayan is one of the best trading countries within the province of Quito, as all the vast variety of Spanish goods from Carthageua are consigned thither and forwarded to Quito; and great numbers of traders go their rounds through the several jurisdictions, to the great conveniency of the towns and villages, which thus supply themselves. Besides this transitory commerce, it has another reciprocal with Quito, to which it exports horned cattle and mules, and receives in return cloths and bays. Its active commerce consists in dried beef, salted pork, roll-tobacco, hog's-lard, rum, cotton, pita, ribbons, and other small wares, which are brought to Choco, and there exchanged for gold; sugar and snuff are imported from Santa Fé and sent to Quito; and the returns to Santa Fé are home-made cloths and bays. Here is also another traffic, which consists in bartering silver for gold; for, there being an abundance of the latter, and a scarcity of the former, silver is brought to exchange for gold; of which great profit is made by converting it into doubloons: the like is also practised at Choco and Barbacoas, which are in the same case as to metals.

Popayan being the centre of all these several kinds of commerce, the most wealthy persons of the whole jurisdiction are here, and five or six of its inhabitants are reckoned to be masters of above 100,000 dollars; twenty to be worth between 40 and 80,000; besides many of smaller, yet handsome, fortunes: and this exclusive of their farms and mines, with which this country abounds.

POPAYAN, the most ancient city in that part of South America where it is situated, and capital of the province or jurisdiction above-described, was founded, in 1537, by Sebastian de Belalcazar, after he had finished the conquest of the whole country now containing the government of Popayan. This city, so denominated in July 1538, is seated on a large plain, commanding on the N. side an uninterrupted prospect of the country. It lies on the E. side of a mountain of a moderate height, called M, from its resemblance to that letter, which being covered with a variety of trees, affords an agreeable view; the west side is also diversified with small eminences. On a spacious plain, near the top of this moun-

tain, is a convent of bare-footed Carmelites; and from it issues a river, which, running through the city, carries away all its soil. This river is called Del Molina, and over it are two bridges, one of stone and the other of wood. About a league to the N. of Popayan flows the river Cauca, which is large and deep, with a rapid current, and subject to dangerous inundations in the months of June, July, and August, the season when the torrents of the mountains of Cuanaacas, where it has its source, are most prevalent, so that the passage of it is extremely dangerous, as many travellers, exposing themselves to the intenseness of the cold, amidst thick snows and violent winds, have fatally experienced. The streets of Popayan are broad, straight, and level, the town being built in a square form; and the houses, which are constructed of unburnt bricks, are many of them handsome, with a story, distinguishing them from those with only a ground floor.

The inhabitants of Popayan and Quito differ very sensibly in their casts; for as at Quito, and the other towns and villages of its jurisdiction, the most numerous class of people is that of the casts which sprung from the intermarriages of Spaniards and Indians; so at Popayan, Carthageua, and other parts where negroes abound, the lower class consists of casts, resulting from the marriages of the whites and negroes; but very few Indian casts. This is owing to the great multitude of negro slaves, kept as labourers at the plantations in the country, the mines, and to do the servile offices in the city; so that the number of Indians here are very few, compared with the other parts of the province. This government has, however, many large villages of them; and it is only in the capital, and other Spanish towns, that they are so greatly out-numbered by the negroes. De Ulloa reckons their number at between 20 and 25,000, including several descendants of noble families in Spain, and supposed to be increasing; but late authors estimate them at only 8000. Popayan is an ancient bishopric, suffragan of the archbishop of Bogota. The church was erected into a cathedral in 1547, and it is the only parochial church in the city. Here are also convents of Dominicans, Franciscans, and Augustines, with a college of Jesuits: all of which have churches. The number of religious in these convents is small. The two nunneries, that of the Incarnation, and that of the order of Santa Teresa, are occupied by a greater number of persons. Popayan is the residence of the governor, who is the chief magistrate of the city, and within the limits of whose government, all matters, civil, military, and political, are under his direction. The annual coinage at Popayan amounts to 1,000,000 dollars; and that of Santa Fé to 1,200,000. N. lat. 2° 27' 30". W. long. 76° 16' 15".

POPE, ALEXANDER, in *Biography*, a very distinguished English poet, was born in London in 1688. His parents were both of the Roman Catholic religion. Soon after the revolution, and his son's birth, the father, who was attached to the exiled king, retired from business to a village in Windsor forest, where he purchased a small house, and a few acres of land, and not choosing to vest his money in government securities, or to trust it in private hands, lived frugally upon the capital. Young Pope was from infancy of a very delicate constitution and a feeble frame of body, and his early disposition, by its gentleness and docility, seemed conformable to his corporeal habit. He was taught the very elements of learning at home, and when he was about eight years of age he was placed under the care of a Romish priest, in Hampshire, where he learnt the rudiments of the Latin and Greek languages. At this period he became acquainted with and read Ogilby's translation of Homer, and Sandy's translation of Ovid's *Metamorphoses*, and

from the perusal of these specimens of English poetry, he may be said to have become a poet himself. At a school in which he was afterwards, in the neighbourhood of London, he had an opportunity of occasionally visiting the theatre, which led him to frame a kind of play from Ogilby's Homer, intermixed with verses of his own, and procured it to be acted by his school-fellows. When he was about twelve years of age, his first poem, "An Ode to Solitude," was written, which, says his biographer, "is nothing remarkable for that age: it shews a correct ear for versification, and a power of neat expression, but affords no indication of fancy or strong feeling." From this time he seems to have been the director of his own studies, as poetry appears to have been adopted by him from his earliest years as a profession, for his poetical reading was at all times accompanied with attempts at imitation or translation. In the latter he soon excelled: "if the translation of the 'Thebais,' and of 'Sappho to Phaon,' made at the age of fourteen, were not much improved in their publication, it may be affirmed that he rose at once almost to perfection in this walk; the latter piece, especially, has never been surpassed." His manners and conversation were probably as much above his years as his productions were; for before he was sixteen he attracted the notice of sir William Trumbull, with whom an intimacy was formed. He now composed his "Pastorals," which gained him many admirers, among whom was Walsh, who was considered as the best English critic of his time. He also formed an intimacy with Mr. Cromwell, a pedant and a beau, whose example produced unfavourable impressions on the youthful poet, who fell into a strain of ironical compliment towards the female sex, mixed with coarseness and indelicacy, so that it has been said, "if the simple, natural, ardent character be supposed congenial to the poet, no one of the tribe set out with a more unpoetical character than Pope;" and it is added, which is uncreditable to a young man, that "he does not appear to have cultivated friendship with any of his own age or condition, and in all his early connexions of this kind, some purpose of obtaining credit and distinction may be traced." His pastorals were printed in 1709, in a volume of Tonson's Miscellanies, and obtained general admiration on account of the melodious sweetness of the versification, and the polished lustre of the diction: they, however, were thought to be deficient in original observation, and to have an artificial cast of sentiment. He was at the same time exercising his talents in compositions of a higher order. He had written his "Ode for St. Cecilia's Day," and in this year he wrote his "Essay on Criticism," which was justly esteemed a master-piece in its kind, and shewed not only the peculiar turn of his talents, but that those talents, young as he was, were ripened nearly to perfection. He was not then more than twenty years of age, and yet the maturity of his judgment, the knowledge of the world, and the penetration into human nature displayed in that piece, were such as would have done honour to the greatest abilities and experience. It cannot, however, be denied, that it has some of the inaccuracies of a juvenile author, and in other respects it has been held rather too high as critical authority. In this piece he made an attack upon the critic John Dennis, who slighted his pastorals, and an open war was carried on between them. Another enemy whom he acquired in consequence of his pastorals was AMBROSE PHILLIPS, (see his article,) and the result was a lasting animosity between them. In 1711 he wrote his "Elegy on an unfortunate Woman," one of his most finished compositions. The story of the lady is enveloped in mystery, and some have supposed that it refers to a person who had inspired him with a real passion; though others have doubted

whether he ever felt the force of a passion, which in him must have been an unfortunate one, since his deformed figure forbade him to expect a return. The elegy is reckoned a very fine piece, considered as poetical eloquence employed on an interesting topic, but at the same time it has too much art and ornament for the expression of genuine feeling. In the following year (1712), he published his "Rape of the Lock," a mock heroic, that outstript all competition, and conferred upon him the chief title he possesses to the merit of invention. The essay on criticism excelled in the didactic way, for which he was peculiarly formed; a clear head, strong sense, and a sound judgment, being his characteristic qualities; but it is the creative power of the imagination that constitutes the poet properly so called, and therefore it is in the "Rape of the Lock" that Pope principally appears one, there being more of the *vis imaginandi* displayed in this poem than in all his other works together. Its ground-work is a trifling incident in fashionable life, and its object appears to be a playful satire on female frivolity, a topic to which he often recurs, amidst all his compliments to the sex. This he pursues with admirable vivacity and polished wit, but the poetry of the work is chiefly conspicuous in his machinery of the sylphs, wrought with unrivalled skill and beauty. About the same time he published the "Temple of Fame," written two years before, and altered from Chaucer. In 1713, Mr. Pope published his "Windsor Forest," the first part of which was written at the age of sixteen, and bears the stamp of juvenility. The concluding part is of a much higher strain, and serves as a scale of the poet's intermediate advancement in the art. In the same year he circulated proposals for publishing a translation of the Iliad by subscription, and almost instantly received such assurances of encouragement, as removed all doubt of an ample remuneration for his labour. He proceeded in his work with diligence, and published the first volume in quarto, containing four books, in the year 1715. Immediately after the appearance of this volume, a rival translation was published under the name of Tickell, to which Addison, who had quarrelled with Pope, seemed to give the preference, and Pope was persuaded that it was his own. This is not, at present, believed to be the case, for Tickell was well able to have written it, and was indeed a better poet than Addison. Pope was extremely exasperated, and wrote some lines of keen and polished satire upon him, which were published and admired. The rival version never went farther than a single book, and sunk before that of Pope. The produce of the subscriptions, which was between seven and eight thousand pounds, enabled him to take that house at Twickenham, which he rendered so famous by his residence and decorations, and he removed thither with his father and mother. The former died in about two years, leaving but a slender subsistence to his family. He had left off business with a fortune of 20,000*l.*, but being a Papist, he could not lay out his money on real securities, and as he adhered to the cause of the exiled James, he made it a point of conscience not to lend it to the existing government, so that, as we have seen, he lived upon the principal, which rapidly diminished his stock. Pope's mother survived her husband many years, comforted and consoled by the truly filial attentions of her son.

It was about this period that he wrote his "Epistle from Eloisa to Abelard," chiefly extracted from the extant letters of those distinguished persons. He has, however, heightened the descriptions, and added warmth to the passions, so as to render it the most impressive of all poems of which love is the subject, but it treads too closely upon the borders of licentiousness to be excused. In 1717, Mr. Pope republished his poems already written, in one volume quarto, to which

he prefixed a very elegant preface, and in 1720 he completed the publication of his Iliad. This stands at the head of metrical translations of the same class, that is, of the splendid and ornamental, formed upon the model of cultivated poetry in the same language, rather than upon the style and character of the original. It made a great addition to the writer's poetical fame, and produced a swarm of critics and depreciators of the work, whose voices were speedily lost in the general applause. In 1721 he published a volume of select poems of his deceased friend Parnell, with a dedication in verse to the earl of Oxford, now a retired statesman, under the frowns of a triumphant party. Pope was always attached to the Tory party, but he had an independent spirit with respect to the great, and entertained enlarged ideas of the nature of government, the authority of which he had generally viewed through the medium of opposition.

In 1721 he engaged, merely for a pecuniary consideration, in a task for which he was not qualified, *viz.* in the editorship of Shakspeare's works, splendidly published by Tonson. His deficiencies as a critical editor were so obvious, that they exposed him to the censure of Theobald, and from that time he not only waged perpetual warfare with Theobald, but became an enemy to editors, collators, commentators, and verbal critics, and tried to persuade the world that he miscarried in this undertaking only by having a mind too great for such minute employment. He next undertook, on the same motives, the love of emolument, the translation of the *Odyssey*, with the assistance of Broome and Fenton. The work was finished in 1725, and brought him a considerable sum. He translated twelve books, which were done in no ways inferior to the *Iliad*. The other twelve, notwithstanding his corrections, alterations, and amendments, were of inferior quality, and he was paid accordingly.

He became acquainted, soon after his removal to Twickenham, with lady Mary Wortley Montague, and ventured to address her in the style of lover, which she thought she might indulge from one of his personal disqualifications, without danger of scandal. He was admitted to correspond with her during her residence abroad, but after her return they became the bitterest foes.

After the publication of the *Odyssey*, Pope appeared almost solely as a satirist and moralist, and in 1727 he joined Swift in a publication of miscellanies, chiefly of a humorous kind, in which he inserted a treatise of the Bathos, or the art of sinking, the ironical precepts of which were illustrated by examples, and in which a classification was given of bad poets. Several of these plainly pointed out living writers, who retaliated by virulent abuse of the author.

He published his *Dunciad* in the year 1728, the object of which was to overwhelm, with indelible ridicule, all his antagonists, together with some other authors, whom spleen or party led him to rank among the dunces, although they had given him no personal offence. "There is not," says one of his biographers, in the *History of Literature*, "scarcely another instance of an eminent writer thus devoting the maturity of his powers to so futile a piece of vengeance, for he himself represents his enemies as such a contemptible set of wretches, that, if left alone, must infallibly sink into speedy oblivion, and in fact several of them are now only known by the place which they occupy in the poem. The diction and versification of the *Dunciad* are in his most finished manner, and shew the pains bestowed upon the work, but its imagery is often extremely gross and offensive." He was first encouraged to personal satire by his friend bishop Atterbury, and he felt that it was so well suited to his disposition, as to bring it into most of his subsequent productions. In one of these, an Epistle on Taste, printed in 1731, he was supposed to have

held up to ridicule the duke of Chandos, who had shewn to the poet many civilities, which excited against him the public indignation; and though he employed every art of equivocation to refute the opinion, he could not effectually clear himself from the charge of ingratitude. By the suggestion of lord Bolingbroke, he planned and wrote the "Essay on Man," which must ever rank high in the first class of ethical poems. In it the author had a fine opportunity of shewing his extraordinary power of managing argumentation in verse, and of compressing his thoughts into clauses of the most energetic brevity, as well as expanding them into passages fraught with every poetic ornament. This piece was attended or followed by his "Imitations of Horace," which had all a satirical cast, and were accompanied by a "Prologue and Epilogue to the Satires," and by his "Moral Epistles or Essays" on the characters of men and women, and on the use of riches. He is reckoned a good imitator of Boileau as a satirist, but more coarse in his language, and at the same time more spirited and poetical.

Mr. Pope was now to appear in a new character, *viz.* that of a letter writer. Some juvenile letters of his to Mr. Cromwell had been surreptitiously published in 1727, and some years afterwards, Curl the bookseller published another collection of letters between Pope and several friends, which had been put secretly into his hands. Though Pope affected so much anger on the occasion, as to procure Curl to be summoned before the house of lords for a breach of privilege, there being some letters from noblemen among the number, yet there were pretty strong proofs that he himself had contrived the plot, in order to obtain a decent excuse for giving an edition in his own name, which he did in a quarto volume by subscription: and the collection was thought to make a valuable addition to English literature. As Pope lost his old friends Gay, Atterbury, and others, he acquired new ones, ready to pay him the respect to which his high reputation seemed to lay claim. Of these, some composed the court of the prince of Wales, then in avowed opposition to his father's ministers, and he was ready to join them in their political warfare. He was flattered by the prince, who dined at his house. Thus stimulated, he wrote his two last satires, denominated from the year in which they were written, "Seventeen hundred and thirty-eight." In the year 1742, Pope added a fourth book to the *Dunciad*, intended to ridicule useless and frivolous studies. In the following year the whole poem came out together, intended as a specimen of a more correct edition of his works. He had made some progress in the design, but did not live to complete it. He had through life been subject to nervous complaints, and at this period an oppressive asthma began to indicate the decline of his weak frame. When the last scene was manifestly approaching, Hooke the historian, one of his friends, and a convert to popery, asked him whether he would not have a priest to administer the last sacrament. Pope replied, that though he did not think it essential, it was very right, and the ceremony was performed. He died soon after, *viz.* on the 30th of May, 1744, at the age of 56, and was interred at Twickenham, where a monument was erected to his memory by bishop Warburton, to whom he had bequeathed the property of all such of his works, already printed, as he had written or should write commentaries upon, and which had not been otherwise disposed of or alienated; with this condition, that they were to be published in future without alterations. In discharge of this trust, that gentleman gave a complete edition of all Mr. Pope's works, in 9 vols. 8vo.

Various characters have been drawn of this poet. Lord Orrery says, "If we may judge of him by his works, his chief aim was to be esteemed a man of virtue. His letters

letters are written in that style; his last volumes are all of the moral kind; he has avoided trifles, and consequently escaped a rock which has proved very injurious to Swift's reputation. He has given his imagination full scope, and yet has preserved a perpetual guard upon his conduct. The constitution of his body might really incline him to habits of caution and reserve. The treatment which he met with afterwards, from an innumerable tribe of adversaries, confirmed this habit, and made him slow in pronouncing his judgment upon persons and things. His manners were delicate, easy, and engaging; and he treated his friends with a politeness that charmed, and a generosity that was much to his honour. Every guest was made happy within his doors, pleasure dwelt under his roof, and elegance presided at his table." Dr. Johnson's account is very different: "His parsimony," he says, "appeared in petty matters, such as writing his compositions on the backs of letters, or in a niggardly reception of his friends, and a scantiness of entertainment. He was full of his fortune, and frequently ridiculed poverty; he seems to have been of an opinion not at all uncommon in the world, that to want money is to want every thing. He was proud of his connection with the great, and boasted that he obtained their notice by no means or servility. He was capable of generous and elevated sentiments, and had a dignified regard to his independence. Implacable in his dislikes, he was firm in his attachments; and Bolingbroke testified of him, that he had never known a man, who had so tender a heart for his particular friends, or more general friendship for mankind. As a poet, admitting that he was deficient in invention, his claim to pre-eminence in other qualities will scarcely be disputed; and it will be generally admitted, that no English writer has carried farther, correctness of versification, strength and splendour of diction, and the truly poetical quality of vivifying and adorning every subject that he touched." Johnson's Lives of the Poets. Warton's Essay on the Writings and Genius of Pope.

POPE, *Papa*, i. e. *universal father*, the bishop of Rome; being the head or patriarch of the Roman Catholic church. Father le Coite, in his Annals, observes, from St. Jerom, St. Cyprian, St. Gregory, St. Augustine, and Sidonius Apollinaris, that the title pope was anciently given to all bishops. Accordingly we find, that in the eighth general council, held at Constantinople in the year 869, which was composed of three hundred bishops, all the patriarchs were there called popes.

Bishops were also addressed under the term *holiness* and *beatitude*; and their churches were called *apostolical sees*.

He adds, that it was only in the eleventh century, that Gregory VII. first appointed, in a synod held at Rome, that the title pope should be restrained to the bishop of Rome, as a particular distinction and prerogative.

It is one of the maxims of Gregory, contained in a famous piece, entitled "*Dictatus Papæ*," that there is no name in the world but his, i. e. as some understand it, he alone is to be styled pope; and F. Paul observes, that the name of pope, formerly common to all bishops, was appropriated by Gregory VII. to the Roman pontiff.

In the council in the Lateran, held under Innocent III. the pope was declared *ordinary of ordinaries*.

The power of the pope has advanced by slow degrees to that plenitude in which it has been exercised in later times. It appears, that towards the end of the third century, the bishop of Rome, in common with those of Antioch and Alexandria, had a kind of pre-eminence over all others, because they were considered as rulers of primitive and apostolic churches. However, this pre-eminence implied no

superior power and authority, infringing on the rights and liberties of other bishops, but merely a power of convening councils, of presiding in them, of collecting voices, and such other things as were essential to the order of those assemblies; a power similar to that which Cyprian, bishop of Carthage, possessed in the African churches. About the close of the fourth century, the bishop of Rome surpassed all his brethren in the magnificence and splendour of the church over which he presided; in the riches of his revenue and possessions; in the number and variety of his ministers; in his credit with the people; and in his sumptuous and splendid manner of living. Nevertheless it is certain, that at this time the bishops of that city had not acquired the pre-eminence of power and jurisdiction in the church, which they afterwards enjoyed. Differences in religion were ultimately decided, and ecclesiastical laws were enacted, either by the emperor or by councils; nor does it appear, that any of the bishops acknowledged that they derived their authority from the permission and appointment of the bishop of Rome, or that they were created bishops by the favour of the apostolic see. But in this century we may trace, in the imprudence of the emperors, the dexterity of the Roman prelates themselves, and the inconsiderate zeal and precipitate judgment of certain bishops, several of those steps by which they afterwards ascended to the summit of ecclesiastical power and despotism. The law of Valentinian, in 372, which empowered the bishop of Rome to examine and judge other bishops, that religious disputes might not be decided by profane and secular judges, approved and confirmed in a council at Rome in 378, proved very favourable to the ambition and advancement of the Roman pontiff; and his votaries have likewise laid great stress on the fourth canon of the council held at Sardis, in 347, which prohibited the election of a successor to a bishop deposed by neighbouring prelates, before the bishop of Rome had examined the cause, and pronounced sentence: but the authority of this council has been generally considered as extremely dubious, and its decrees have been regarded by many as altogether fictitious and spurious. In the fifth century a variety of circumstances united in augmenting the power and authority of the bishop of Rome; though he had not, as yet, assumed the dignity of supreme law-giver and judge of the whole Christian church. The bishops of Alexandria and Antioch, unable to make head against the lordly prelate of Constantinople, fled often to the Roman pontiff for succour; and the inferior order of bishops used the same method, when their rights were invaded by those prelates. The protection afforded them by the Roman pontiff was the means of extending his dominion in the East, and of imperceptibly establishing his supremacy. In the West its increase was owing to other causes; the declining power, and the supine indolence of the emperors, left the authority of the bishop who presided in their imperial city almost without controul. The incursions, moreover, and triumphs of the barbarians, contributed to its advancement; for the kings, who penetrated into the empire, when they perceived the subjection of the multitude to the bishops, and the dependence of the bishops upon the Roman pontiff, resolved to reconcile this ghostly ruler to their interests, by loading him with various kinds of honours and benefits. However, the Africans could not be prevailed upon, by threats and promises, to submit the decision of their controversies, and the determination of their causes, to the Roman tribunal. Although the Roman pontiffs artfully availed themselves of every circumstance that could contribute to their obtaining universal dominion, yet it is certain, that towards the close of the sixth century, the emperors, and the nations in general, were far from being disposed

disposed to bear with patience the yoke of servitude, which the see of Rome was arrogantly imposing upon the Christian church. The Gothic princes set bounds to the power of the bishop of Rome in Italy, permitted none to be raised to the pontificate without their approbation, and reserved to themselves the right of judging concerning the legality of every new election. They enacted spiritual laws, called the religious orders before their tribunals, and summoned councils by their regal authority.

In the beginning of the seventh century, or about the year 606, Boniface III., as Baronius relates, engaged the emperor Phocas to take from the bishop of Constantinople the title of œcumenical or universal bishop, and to confer it upon the Roman pontiffs; and thus, as it is said, introduced the papal supremacy. But the ambitious views of the bishops of Rome were still vigorously opposed, not only by several emperors and princes, but also by whole nations; and the civil magistrate retained his influence in religious matters, and the Roman pontiffs were obliged to acknowledge their subordination to the regal authority. No event seems to have been more favourable to their ambitious views than the part they took in the eighth century, in promoting the advancement of the traitor Pepin to the throne of Childeric III. in anointing and crowning him as king of France. This proved an abundant source of opulence and credit to the church, and to its aspiring ministers; for Pepin, having obtained two victories over Aistulphus, king of the Lombards, in 754 and 755, compelled him to deliver up to the see of Rome the exarchate of Ravenna, Pentapolis, and all the cities, castles, and territories, which he had seized in the Roman dukedom. And thus the bishop of Rome was raised to the rank of a temporal prince. The grant of Pepin was afterwards confirmed by his son Charlemagne, who also ceded to the Roman pontiffs several cities and provinces in Italy, which were not contained in his father's grant; reserving to himself the supreme dominion. It is said that a pretended grant of Constantine the Great was made use of both by Adrian I. and Leo III. in order to persuade Charlemagne to this donation. At this time the power of the pope was subordinate to that of the emperors, and confined within very narrow limits. The right of election was vested in the emperor, and his approbation was necessary to the consecration of the bishops of Rome. However, their authority and affluence greatly increased from the time of Lewis the Meek, and more especially from the accession of Charles the Bald to the imperial throne. Their power was augmented in a very considerable degree by the divisions and troubles that arose in the empire towards the close of the ninth century: the emperors were divested of their ecclesiastical authority, the power of the bishops was greatly diminished, and even the authority of both provincial and general councils began to decline. The Roman pontiffs availed themselves of various circumstances that occurred at this time to promote an opinion that the bishop of Rome was constituted by Jesus Christ supreme legislator and judge of the church universal; and that, therefore, the bishops derived all their authority from the Roman pontiff, and that the councils could not determine any thing without his permission and consent. They had also recourse to forged memorials, acts of councils, and epistles, in order to establish their claims to supremacy. The most notorious forgeries of this kind were the decretal epistles, compiled by an obscure writer, but ascribed, in order to give them credit, to Isidore, bishop of Seville. In the tenth century, a novel doctrine was propagated by some mercenary and interested prelates, who publicly maintained that the Roman pontiffs were not only bishops of Rome, but of the whole world; and that

their authority, though divine in its origin, was conveyed to them by St. Peter, the prince of the apostles. The cruades (see *CROISADES*) of the eleventh century very much contributed to the augmentation of the influence and authority of the Roman pontiffs; so that towards the close of this century they seem to have attained the zenith of their dominion. From the time of Leo IX. the popes employed every method, which the most artful ambition could suggest, to render their dominion both despotic and universal. They not only aspired to the character of supreme legislators in the church, to an unlimited jurisdiction over all synods and councils, whether general or provincial, to the sole distribution of all ecclesiastical honours and benefices, as divinely authorized and appointed for that purpose, but they carried their insolent pretensions so far as to give themselves out for lords of the universe, arbiters of the fate of kingdoms and empires, and supreme rulers over the kings and princes of the earth. Gregory VII. seems to have exceeded all his predecessors in the lust of dominion, as well as in the success which attended his endeavours to obtain it. He considered the Roman pontiff, under the character of Christ's viceregent, as the king of kings, and the whole universe as his rightful domain. Accordingly, with an arrogance hardly to be paralleled, he claimed tribute from France, Saxony, Spain, England, the most powerful of the German princes, Hungary, Denmark, Poland, &c. soliciting them to do homage to the Roman see, to make a solemn grant of their kingdoms and territories to the prince of the apostles, and to hold them under the jurisdiction of his vicar at Rome, as fiefs of the apostolic see. If the success of this pontiff had been answerable to the extent of his insolent views, all the kingdoms of Europe would have been this day tributary to the Roman see, and its princes the soldiers or vassals of St. Peter, in the person of his pretended vicar upon earth. Many of his attempts, however, were crowned with a favourable issue, and from the time of his pontificate, the face of Europe underwent a considerable change, and the prerogatives of the emperors, and other sovereign princes, were necessarily diminished. In Italy his success was the most remarkable; for he prevailed upon Matilda, the daughter of Boniface, duke of Tuscany, to settle all her possessions in Italy and elsewhere upon the church of Rome; and though the Roman pontiffs have not been able to preserve the whole inheritance, thus granted to them, they long remained in the possession of a considerable part of it. See *ECCLESIASTICAL State*.

The monstrous power of erecting new kingdoms, which had been claimed by the pontiffs from the time of Gregory VII., was not only assumed, but exercised also by Alexander III. in a remarkable instance; for in the year 1179 he conferred the title of king, with the ensigns of royalty, upon Alphonso I. duke of Portugal, who, under the pontificate of Lucius II., had rendered his province tributary to the Roman see. In the thirteenth century the same ambitious spirit governed the councils and proceedings of succeeding pontiffs; and they were industrious in inculcating the maxim, that the bishop of Rome is the supreme lord of the universe, and that neither princes nor bishops, civil governors nor ecclesiastical rulers, have any lawful power in church or state, that is not derived from them. In consequence of this arrogant pretension, they not only claimed the right of disposing of ecclesiastical benefices, but of conferring civil dominion, and of dethroning kings and emperors, according to their good pleasure. They also assumed to themselves the power of disposing of the various offices of the church, and of creating and deposing bishops, abbots, and canons, according to their fancy.

Instances

Instances of these practices occur in the pontificates of Innocent III., Honorius III., Gregory IX., and of several of their successors. And Boniface VIII. maintained, in the most express and inapparent terms, that the universal church was under the dominion of the pontiffs, and that princes and lay patrons, councils and chapters, had no more power in spiritual things than what they derived from Christ's vicar upon earth. Under Innocent III. and Nicholas IV. the possessions and revenues of the Roman see received very considerable augmentation, partly by the events of war, and partly by the munificence of kings and emperors; and arrived at that high degree of grandeur and opulence, which it maintained almost to our times. The former of these pontiffs followed the steps of Gregory VII., and not only usurped the despotic government of the church, but claimed also the empire of the world, and thought of nothing less than subjecting the kings and princes of the earth to his lordly sceptre. In Asia and Europe he disposed of crowns and sceptres with the most wanton ambition. The Roman pontiffs derived great advantages in the exercise of their dominion from the attachment and zeal of the several orders of Mendicants. In the fourteenth century the papal authority diminished by reason of the continued residence of the popes in France: and in the fifteenth century, by the schism which happened in the papacy, the dawnings of the reformation, and a variety of other concurring causes. In the councils of Constance, held in 1414, and of Basle, opened in 1431, the power of the Roman pontiffs was declared to be inferior and subordinate to that of general councils, and the papal impositions, called expectatives, reservations, and provisions, were entirely annulled. The revival of learning, and the progress of the reformation in the succeeding century, contributed very much to the abridgment of the papal authority; not only by withdrawing several provinces from the yoke of papal tyranny, but by producing a change in the sentiments of many kings and princes, and sovereign states, who adhered to the religion of Rome, with respect to the claims and pretensions of its bishop. Besides, it is necessary to observe, that the authority of the pope is circumscribed by various limits in the different countries where his spiritual jurisdiction is acknowledged; and that in all his decisions relating to the government of the church, he previously consults the cardinals who form his privy council; and in matters relating to religious doctrine, he is obliged to ask the advice of eminent divines; and that matters of different degrees of moment are referred to the conduct of certain colleges, called *congregations*. It is well known, that when the authority of the pope declined in Europe, he sought to extend the limits of his spiritual dominion to other parts of the globe, and for this purpose deputed missionaries to gain proselytes. And a new order was formed, that became afterwards so famous, under the appellation of *Jesuits*, in order to preserve those parts of the papal dominions that remained yet entire, and to augment them by new accessions. The fate of this fraternity is well known; and many circumstances seem to concur in different countries, hitherto devoted to the see of Rome, that are likely to reduce within very narrow limits the spiritual jurisdiction and secular dominion of the pope. For a brief account of the rise, establishment, and decline of the church of Rome, see the article *CHURCH*.

The pope is chosen by the cardinals out of their own body.

In the first ages of the church, the people and the priests, and sometimes only the priests, elected the pope, according to the plurality of voices. The emperors afterwards claimed

the right of confirming the election. In the eighth century, pope Adrian I. in a council of bishops assembled at Rome, conferred upon Charlemagne and his successors the right of election; and they reserved to themselves the privilege of approving the person that was elected by the priests and people; nor was the consecration of the elected pontiff valid, unless performed in the presence of the emperor's ambassadors. The election, however, after undergoing many revolutions as to the form of it, is now referred to the cardinals in conclave.

The see of the pope is at Rome, whence he issues out his orders, called *briefs* and *bulls*, throughout the Catholic world.

The person of the pope, says Mr. Eustace, in the second volume of his "Classical Tour," may be considered in two very different capacities, as temporal sovereign of the Roman territory, and as chief pastor of the Catholic church. In order, says our candid Catholic author, to give the Protestant reader a clear and precise idea of the rights which every Catholic considers as inherent in the Roman see, or, as he adds, to speak more correctly, in the successor of St. Peter, it will be necessary to observe, that the pope is bishop of Rome, metropolitan and primate of Italy, of Sicily, and of Macedonia, &c., and patriarch of the West: that in each of these capacities he enjoys the same privileges and the same authority as are enjoyed by other bishops, metropolitans, primates, and patriarchs, in their respective dioceses and districts; that his authority, like theirs, is confined within certain limits marked out by ancient custom, and by the canons; and that, like theirs also, it may be modified or suspended by the church at large. "I shall only add," says our author, "that as patriarch of the West, the pope enjoys a pre-eminence elevated enough to satisfy the wishes of the most ambitious prelate, as by it he ranks before all western ecclesiastics, and takes place and precedence on all occasions." But, as Mr. E. proceeds, "the Roman pontiff claims honours still more distinguished, and as successor of St. Peter is acknowledged by the Catholic church to sit as its first pastor by divine institution." According to a canon of the general council of Florence, cited by our author, "the pope enjoys, by the institution of Christ, the primacy of honour and jurisdiction over the whole Christian church, and to refuse it to him would be deemed an act of rebellion. But no authority has yet determined, and it seems indeed difficult to fix the precise rights and prerogatives which are conferred by this primacy, or flow immediately from it, so that to oppose their exercise or to deny their existence would be either schism or heresy. Suffice it to say, that the greater part of the powers exercised by the popes, and especially those acts which have been considered as the most offensive in themselves as well as galling to other bishops, are allowed to be of human institution. In fact, the object of the canon above-mentioned, as also of the article corresponding with it in the creed of Pius IV., seems to have been solely to ascertain the existence of a *divinely* appointed superior in the Catholic church, leaving in the interim the mode of exercising his prerogative to the canons and discipline of the same church, to be enlarged or restrained as its exigencies may require. But though no temporal advantages are originally, or by its institution, annexed to it, yet it is evident that such an elevated dignity must naturally inspire reverence, and consequently acquire weight and consideration. Influence, at least in a certain degree, must accompany such consideration, and give the spiritual pastor no small degree of worldly importance."—"But besides the consideration inseparable from the office itself, another source

source of temporal greatness may be found in the extensive possessions of land, and in the great riches in plate, of the Roman church itself. These riches were considerable even under the Pagan emperors, and during the persecutions, as we may presume from various passages in ancient authors, and they were not a little increased by the liberal donations of the Christian princes, and particularly of Constantine the Great." After all the invasions and spoliations which the Roman church has experienced, "it still retained extensive possessions, not in Italy only, but in Sicily, and other more distant provinces." From the period in which Gregory the Great distributed the wealth of the church for the relief of innumerable objects of distress, and by his talents, as a statesman, rescued Rome and Italy from the intrigues of the imperial court, from the weakness and wickedness of the exarchs, and from the fury of the Longobardi, then a recent and most savage horde of invaders;—"from this period," says our author, "though the Greek emperors were the nominal, yet the popes became the real and effective sovereigns of Rome, and attached to it, as they generally were, by birth, and always by residence, duty, and interest, they promoted its welfare with unabating, and oftentimes, successful efforts. Upon the merits of these services, therefore, and the voluntary submission of an admiring and grateful flock, rests the original and best claim which the Roman pontiffs possess to the temporal sovereignty. But though this sovereignty was enjoyed, many years elapsed before it was avowed on the side of the pontiff, or admitted on that of the emperor, and many more ages before it was fully and finally established on a solid and unshaken basis."—"From the tenth century," says our author, "the popes began to degenerate from the piety of their predecessors, and to sacrifice their spiritual character to their temporal interests; Rome became the theatre of insurrection, warfare, and intrigue; and continued so, with various intervals of tranquillity, occasioned by the intervening reigns of milder pastors, till the sixteenth century, when they resumed the virtues of their early predecessors, and by them regained the veneration and affection of their flocks. Since that period the pope has reigned pastor and prince, an object at once of the reverence and of the allegiance of the Roman people, seldom alarmed by foreign invasion, or insulted by domestic insurrection; devoted to the duties of his profession, the patron of the arts, the common father of Christendom, and the example and oracle of the Catholic hierarchy."—"But though the pope is both bishop and prince, yet his titles, dress, equipage, and the whole ceremonial of his court, are adapted to the first of these characters. He is styled Holiness, the Holy Father, and sometimes, in history, the Sovereign Pontiff; but the former appellations, as more appropriate to his duties and functions, are exclusively used in his own court. His robes are the same with those of a bishop in pontificals, (excepting the stole and the colour, which is white and not purple.) His vestments, when he officiates in church, as well as his mitre, do not differ from those of other prelates. The tiara seems originally to have been an ordinary mitre, such as is still worn by the Greek patriarchs. The three circlets, which have raised it into a triple crown, were added at different periods, and, it is said, for different mystic reasons. The first, or lowest, seems to have been originally a mere border, gradually enriched with gold and diamonds. The second was the invention of Boniface VIII. about the year 1300; and to complete the mysterious decoration, the third was superadded about the middle of the 14th century. The use of the tiara is confined to certain extraordinary occasions, as in most great ceremonies the pope used the common episcopal mitre."—

"Whenever he appears in public, or is approached even in private, his person is encircled with reverence and with majesty. In public, a large silver cross, raised on high, is carried before him, as a sacred banner; the church bells ring as he passes, and all kneel in his sight. When he officiates at the patriarchal Basilicæ he is carried from his apartments in a chair of state, though in the chancel his throne is merely an ancient episcopal chair, raised only a few steps above the seats of the cardinals or clergy."—"When he is approached in private, he has, in his anti-chamber, a prelate in full robes, always in waiting, and when the bell rings, the door of the pontifical apartment opens, and the pope is seen in a chair of state with a little table before him. The person presented kneels once at the threshold, again in the middle of the room, and lastly, at the foot of the pontiff, who, according to circumstances, orders him to kiss the cross embroidered on his shoes, or presents his hand to raise him. The pontiff then converses with him a short time, and dismisses him with some slight present of beads or medals, as a memorial. The ceremony of genuflexion is again repeated, and the doors close." Our author observes, in order to obviate some objections that will naturally occur to the minds of Protestants, that "in all the ceremonial of the Roman church and court, the only parts liable to misrepresentation or censure, are certain additions of later times, when, in religious pomps and court pageants, in dress and in style, all was inflated and cumbersome. The rule of reform is easy and obvious; to prune off the excrescences of barbarous ages, and to restore the majestic forms of antiquity." The offices which the pontiff is required to perform occupy a very considerable part of his time; so that "a morning of business and application closes with a solitary meal; and a walk in the gardens of the Quirinal or the Vatican, a visit to a church or an hospital, are his only exercises." It is observed, that the pope never dines in company, so that to him a repast is no recreation; it is consequently short and frugal.

"To speak of the prerogative of the pontiff as a sovereign," says our author, "is scarcely necessary; as it is known to be uncontroled by any legal or constitutional authority; a despotism which, though mildly exercised, is diametrically opposite both to the interests of the people and to the personal happiness of the prince himself. The mischiefs that result from hence to the former are obvious, while the latter, if alive to sentiments of religion and of moral obligation, as the modern sovereigns of Rome must unquestionably be, cannot but tremble under the weight of a responsibility so awful thus confined to his own bosom. To share it with the best and wisest members of the state is safe, and would at the same time be so glorious, that we should be tempted to wonder that the experiment had never been tried, if every pope in history did not prove how sweet despotism is to the vitiated palate of sovereigns. But if any monarch had either an opportunity or an inducement to realize the generous plan formed by Servius Tullius, of giving liberty and a constitution to his people, the popes, we should imagine, could have wanted neither."

The prime ministers of the Roman pontiff are the cardinals, who constitute a college, and whose principal and most honourable privilege is that of electing the pope. The number of titles, or churches, says our author, which gave a title to this dignity, is 72 (others have reckoned 70). (See CARDINAL and COLLEGE.) The grand assembly of the cardinals is called the *consistory* (which see), where the pontiff presides in person. This assembly is not precisely a council, as it seldom discusses, but witnesses the ratification of measures, previously weighed and adopted in the cabinet of the pontiff. But the chief prerogative of a cardinal is exercised in the *conclave*

(which see), so called because the members of the sacred college are there confined within the precincts of the great halls of the Vatican palace, where they remain immured till they agree in the election of a pope. For the general mode of electing the pope, we shall refer to the article CONCLAVE, and merely mention in this place two or three ceremonies that are practised during the process, and at the conclusion of the election. The first we shall mention is the custom of putting the tickets containing the votes of the cardinals in the patena (or communion plate), and then into the chalice. To this ceremony our author objects, because the application to this purpose of the vase, devoted in a peculiar manner to the most awful institutions of religion, seems to pass beyond disrespect, and almost to border on profanation. The next ceremony is that called the adoration of the pope, which takes place almost immediately after his election, when he is placed in a chair on the altar of the Sixtine chapel, and there receives the homage of the cardinals: this ceremony is repeated again on the high altar of St. Peter's. (See ADORATION.) Our author vindicates the ceremony of adoration paid to the pope, and his being placed on a throne, because he is both pontiff and prince; but he objects to the altar's being made his footstool. Another ceremony which we shall mention is the following. "As the new pontiff advances towards the high altar of St. Peter's, the master of the ceremonies kneeling before him, sets fire to a small quantity of tow placed on the top of a gilt staff, and as it blazes and vanishes in smoke, thus addresses the pope, 'Sancte Pater! sic transit gloria Mundi!' This ceremony is repeated thrice."—"When the late pope was torn from his capital by the orders of the French directory, and dragged prisoner into France, the cardinals were banished, or departed with circumstances of peculiar cruelty, and the cardinal *Chiaromonte* of course shared in common with his brethren the hardships and dangers of this persecution. On the death of Pius VI. the cardinals assembled in conclave at Venice, and in a short time unanimously proclaimed cardinal *Chiaromonte* pope. The election took place in the month of March 1800. The French were obliged to evacuate Rome about the same period, and the pope embarked for Ancona, and made his public entry into Rome in the following April." Pius VII. is of a noble family, whose name is *Chiaromonte*, and became early in life a Benedictine monk of the abbey of St. Giorgio at Venice. "To relieve the sufferings of his people," says our author, "and to restore the finances of the country, was his first object, and to attain it he began by establishing a system of the strictest economy in his own household and around his own person. He next suppressed all immunities or exemptions, and subjected the nobility and the clergy to the same or to greater burthens than the lower orders." Notwithstanding several useful regulations that were adopted, the general amount of the taxes is considerably increased. "Other salutary arrangements are, it is said, in contemplation, and the good intentions, the sense, and the virtuous feelings of Pius VII., encourage the hope, that his reign, if he be not thwarted in his designs, will be the commencement of an era of reform and of prosperity."—"At the present crisis," says Mr. Eustace, "when the temporal possessions of the Roman church are at the mercy of the strongest, a spirit of conciliation is perhaps the best calculated to preserve their integrity; and even in the spiritual concerns of the apostolic see, the interest of religion may doubtless be best consulted by such concessions and changes in discipline as the reason or even the prejudices of the age may seem to demand. In both these respects, and particularly in the latter, the lenient and judicious pontiff is likely to employ his authority in a manner highly conducive to public utility." But the Roman court was, for a long time,

alarmed by the power of the French government. The exercise of this hostile power, however, terminated with the late glorious revolution in France, when Buonaparte abandoned the throne, and Louis XVIII. was restored, and the pope resumed his authority.

The income of the pope has varied at different periods. Several years ago, when in full possession of the territory of the Roman court, both in Italy and in France, it was not calculated at more than six hundred thousand pounds. This income arose principally, as our author asserts, in opposition to a very general opinion, from internal taxation, and a very small part of it was derived from Catholic countries. This part may be comprized under the two heads of annats and of dispensations; and these, when united, did not produce in France, the richest and most extensive of Catholic countries previous to the revolution, more than fifteen thousand pounds *per annum*. In Spain the annats had been abolished, or rather bought off; and in Germany, as it is apprehended, suppressed. Dispensations, that is, licences to take orders, to hold livings, to contract marriages, and to do various acts, in cases and circumstances contrary to the prescriptions of the common canon law, produced merely sufficient to pay the expences of the courts through which they necessarily passed, and added little to the papal revenue. As for the concourse of pilgrims, which was supposed to be so very productive a source of income, it brought nothing to Rome but the filth and the beggary of Catholic Europe, and entailed an expence for their support in the hospitals, where they were received and maintained. "The revolutionary invasion of Italy, and the consequent dismemberment of part of the Roman territory, lessened the papal income, not only by diminishing the number of persons who contributed to it, but by impoverishing all the inhabitants of the Roman state, and by depriving even the industrious of the means of paying the taxes. In truth, the greatest distress still prevails at Rome, and the government, it is said, can scarce collect the sums essential to its very existence."

In estimating the expenditure of the Roman court, we shall restrict ourselves to the causes of disbursement which are peculiar to the pontifical treasury. In order to support the missionaries that have been sent to various parts of the globe, there are several establishments at Rome, and one in particular, which from its object is called the "Collegium de propaganda fide." To prepare persons for the undertaking of missionaries, and to establish seminaries for their education, has been an object of primary importance, and has called forth annual sums, which have formed a considerable part of papal expenditure. In this article may be added the support of several hospitals, asylums, schools, and colleges founded by various popes for objects in their times pressing, and still maintained by the apostolical treasury. Moreover, the same treasury has to keep all the public edifices in repair, especially those immense palaces, which, though of little use as residences, are the receptacles of all the wonders of ancient and modern art; to protect the remains of ancient magnificence from further dilapidation; to support the drainage of the Pomptine marshes; and, in fine, to continue the embellishment and amelioration of the capital and of its territory. When to these burthens we add the pensions which the pope is accustomed to settle on bishops when unusually poor and distressed, and the numberless claims upon his charity from every part of Europe, we shall not be surprised either at the expenditure of an income not very considerable, or at the difficulties under which the papal treasury laboured towards the end of the late pontiff's reign.

Our author, in accounting for his having omitted the "infallibility" of the pope, asserted to be his most glorious prerogative, and for the supposed maintenance of which Catholics

Catholics have so long suffered the derision and contempt of their antagonists, observes, "that there is no such article in the Catholic creed; for according to it, infallibility is ascribed not to any individual or even to any national church, but to the whole body of the church extended over the universe. That several theologians, particularly Italian and Spanish, have exaggerated the powers and privileges of the pope, is admitted; and it is well known, that among these, some or rather several carried their opinion of pontifical prerogative so high, as to maintain that the pontiff, when deciding "ex cathedra," or officially, and in capacity of first pastor and teacher of the church, with all the forms and circumstances that ought to accompany such decisions, such as freedom, deliberation, consultation, &c. was by the special protection of providence secured from error. The Roman court favoured a doctrine so conformable to its general feelings, and of course encouraged its propagation, but never pretended to enforce it as an article of Catholic faith, or ventured to attach any marks of censure to the contrary opinion. This latter opinion, the ancient and unadulterated doctrine of the Catholic church, prevailed over Germany, the Austrian empire, Poland, the Low Countries, and England; and in France was supported by the whole authority of the Gallican church, and by the unanimous declaration of all the universities. So rigorously indeed was their hostility to papal infallibility enforced, that no theologian was admitted to degrees, unless he supported in a public act the four famous resolutions of the Gallican church against the exaggerated doctrines of some Italian divines relative to the powers of the Roman see. These resolutions declare, that the pope, though superior to each bishop individually, is yet inferior to the body of bishops assembled in council; that his decisions are liable to error, and can only command our assent when confirmed by the authority of the church at large; that his power is purely spiritual, and extends neither directly nor indirectly to the temporalities or prerogatives of kings and princes; and, in fine, that his authority is not absolute or despotic, but confined within the bounds prescribed by the canons and the customs of the church. This doctrine was taught in all the theological schools, that is, in all the universities and seminaries in France, as well as in all the abbeys; and was publicly maintained by the English Benedictine college at Douay.

The conclusion to be drawn from these observations is, first, that no Catholic divine, however attached to papal prerogative, ever conceived an idea so absurd as that of ascribing infallibility to the *person* of the pontiff; and, secondly, that those theologians who ascribed infallibility to papal decisions when clothed with certain forms, gave it as *their* opinion only, but never presumed to enforce it as the doctrine of the Catholic church. "Therefore," says our author, "to taunt Catholics with papal infallibility as an article of their faith, or to urge it as a proof of their necessary and inevitable subserviency to the determinations of the Roman court, argues either a great want of candour, or a great want of information."

For an account of the character and general conduct of the popes before and after the time of Gregory the Great, which our author has laboured to vindicate, and on which, indeed, he has pronounced an elaborate eulogy, we refer to Eustace's "Classical Tour," vol. ii. Appendix.

We have enlarged on this article, because we wish to give Catholics, and especially so able and so liberal a writer as Mr. Eustace, an opportunity of advocating their own cause; and also to remove prejudices, which have a tendency to obstruct and delay the extension of religious freedom. Nevertheless, we disclaim the opinion of all those who maintain the *divine right* of the Roman pontiffs, nor can we join in

sentiment with a late eloquent writer (Chateaubriand), cited by our author, and incline with him, "to discover something sublime in the establishment of a common father in the very centre of Christendom, within the precincts of the eternal city once the seat of empire, now the metropolis of Christianity; to annex to that venerable name sovereignty and princely power; and to entrust him with the high commission of advising and rebuking monarchs, of repressing the ardour and intemperance of rival nations, of raising the pacific cross between the swords of warring sovereigns, and checking alike the fury of the barbarian, and the vengeance of the despot." *One is our master, even Christ*; and it is from the diffusion and prevalence of the genuine spirit of his religion, and not from the interference of worldly power in his kingdom, that we augur the peace and prosperity of the Christian world, and the permanence as well as diffusion of the Christian faith.

We shall here subjoin a brief account of the causes that contributed to the introduction and establishment of the papal power in our own country, and also to its decline and termination.

The ancient British church, whensoever or by whomsoever planted, was a stranger to the bishop of Rome, and his pretended authority. But when the Saxons invaded the country, they compelled the professors of Christianity to withdraw to the remotest corners of our island, and their own conversion was afterwards effected by Augustin the monk, and other missionaries from the court of Rome. This naturally introduced some few of the papal corruptions in point of faith and doctrine; but we read of no civil authority claimed by the pope in these kingdoms, till the era of the Norman conquest; when the reigning pontiff, having favoured duke William in his projected invasion, by blessing his host and consecrating his banners, laid hold of that opportunity for the purpose of establishing his spiritual encroachments; being permitted to do this by the policy of the conqueror, in order more effectually to humble the Saxon clergy, and aggrandize his Norman prelates: prelates who, being bred abroad in the doctrine and practice of slavery, had contracted a reverence and regard for it, and took a pleasure in rivetting the chains of a free-born people. For the purpose of more effectually enslaving the consciences and minds of the people, the Romish clergy themselves paid the most implicit obedience to their own superiors or prelates; and they, in their turns, were as blindly devoted to the will of the sovereign pontiff, whose decisions they held to be infallible, and his authority co-extensive with the Christian world. Hence his legates *à latere* were introduced into every kingdom of Europe; his bulls and decretal epistles became the rule both of faith and discipline; his judgment was the final resort in all cases of doubt or difficulty; his decrees were enforced by anathemas and spiritual censures; he dethroned even kings that were refractory, and denied to whole kingdoms (when undutiful) the exercise of Christian ordinances, and the benefit of the gospel of God. Something was still wanting besides this spiritual authority, which only operated on conscientious minds, to establish dominion; and the court of Rome was fully apprized that power could not be maintained nor exercised for any long time, and to any great extent, without property, and therefore to the acquisition of this its attention was very sedulously directed. Doctrines and practices were enjoined that were likely to secure pecuniary advantages. The doctrine of purgatory was of this kind, for it was accompanied with the purchase of masses to redeem the souls of the deceased. New-fangled offences were created, and indulgences were sold to the wealthy, for liberty to sin with-

out danger. The canon law took cognizance of crimes, enjoined penance *pro salute animæ*, and commuted that penance for money. Non-residence and pluralities among the clergy, and marriages among the laity related within the seventh degree, were strictly prohibited by canon; but dispensations were seldom denied to those who could afford to buy them. In short, all the wealth of Christendom was gradually drained, by a thousand channels, into the coffers of the holy see.

The establishment of the feudal system in most of the governments of Europe, by which the lands of all private proprietors were declared to be holden of the prince, gave a hint to the court of Rome for usurping a similar authority over all the preferments of the church; which began first in Italy, and gradually spread itself into England. The pope became a feudal lord; and all ordinary patrons were to hold their right of patronage under this universal superior. Estates held by feudal tenure, being originally gratuitous donations, were at that time denominated "beneficia;" and the care of the souls of a parish thence came to be denominated a "benefice." Lay fees were conferred by investiture or delivery of corporal possession; and spiritual benefices, which at first were universally donative, now received in like manner a spiritual investiture, by institution from the bishop, and induction under his authority. As lands escheated to the lord, in defect of a legal tenant, so benefices lapsed to the bishop upon non-presentation by the patron, in the nature of a spiritual escheat. The annual tenths collected for the clergy were equivalent to the feudal render, or rent reserved upon a grant; the oath of canonical obedience was copied from the oath of fealty required from the vassal by his superior; and the "primer seisin" of our military tenures, by which the first profits of an heir's estate were cruelly extorted by his lord, gave birth to as cruel an exaction of first-fruits from the beneficial clergy. And the occasional aids and talliages, levied by the prince on his vassals, gave occasion to the pope to levy, by the means of his legates *à latere*, peter-pence and other taxations. At length the holy father went a step beyond any example of either emperor or feudal lord. He reserved to himself, by his own apostolical authority, the presentation to all benefices which became vacant while the incumbent was attending the court of Rome upon any occasion, or on his journey thither, or back again; and moreover such also as became vacant by his promotion to a bishopric or abbey: "etiam si ad illa personæ consueverint et debuerint per electionem aut quemvis alium modum assumi." And this last, the canonists declared, was no detriment at all to the patron, being only like the change of a life in a feudal estate by the lord. Dispensations to avoid these vacancies begat the doctrine of *commendams*: and papal *provisions* were the previous nomination to such benefices, by a kind of anticipation, before they became actually void; though afterwards indiscriminately applied to any right of patronage exerted or usurped by the pope. In consequence of which the best livings were filled by Italian and other foreign clergy, equally unskilled in and averse to the laws and constitution of England. The very nomination to bishoprics, that ancient prerogative of the crown, was wrested from king Henry I., and afterwards from his successor king John; and seemingly indeed conferred on the chapters belonging to each see: but by means of the frequent appeals to Rome, through the intricacy of the laws which regulated canonical elections, was eventually vested in the pope. And, to sum up this head with a transaction most unparalleled and astonishing in its kind, pope Innocent III. had at length the effrontery to demand, and king John had the meanness to consent to, a resignation of

his crown to the pope, whereby England was to become forever St. Peter's patrimony; and the dastardly monarch re-accepted his sceptre from the hands of the papal legate, to hold as the vassal of the holy see, at the annual rent of a thousand marks.

Moreover, not content with the ample provision of tithes, which the law of the land had given to the parochial clergy, the court of Rome endeavoured to grasp at the lands and inheritances of the kingdom, and (had not the legislature withstood them) would by this time have probably been masters of every foot of ground in the kingdom. To this end they introduced the monks of the Benedictine and other rules, men of four and austere religion, separated from the world and its concerns by a vow of perpetual celibacy, yet fascinating the minds of the people by pretences to extraordinary sanctity, while all their aim was to aggrandize the power and extend the influence of their grand superior the pope. And as, in those times of civil tumult, great rapines and violence were daily committed by overgrown lords and their adherents, they were taught to believe, that founding a monastery a little before their deaths would atone for a life of incontinence, disorder, and bloodshed. Hence innumerable abbeys and religious houses were built within a century after the conquest, and endowed, not only with the tithes of parishes which were ravished from the secular clergy, but also with lands, manors, lordships, and extensive baronies. And the doctrine inculcated was, that whatever was so given to, or purchased by, the monks and friars, was consecrated to God himself; and that to alienate or take it away was no less than the sin of sacrilege.

Many other contrivances were set on foot by the court of Rome for effecting an entire exemption of its clergy from any intercourse with the civil magistrate: such as the separation of the ecclesiastical court from the temporal; the appointment of its judges by merely spiritual authority, without any interposition from the crown; the exclusive jurisdiction it claimed over all ecclesiastical persons and causes; and the *privilegium clericale*, or benefit of clergy, which delivered all clerks from any trial or punishment except before their own tribunal. Nevertheless, though this plan of pontifical power was so deeply laid, and so indefatigably pursued by the unwearied politics of the court of Rome through a long succession of ages; notwithstanding it was polished and improved by the united endeavours of a body of men, who engrossed all the learning of Europe for centuries together; notwithstanding it was firmly and resolutely executed by persons the best calculated for establishing tyranny and despotism, being fired with a bigotted enthusiasm, (which prevailed not only among the weak and simple, but even among those of the best natural and acquired endowments), unconnected with their fellow-subjects, and totally indifferent what might befall that posterity to which they bore no endearing relation:—yet it vanished into nothing, when the eyes of the people were a little enlightened, and they set themselves with vigour to oppose it. So vain and ridiculous is the attempt to live in society, without acknowledging the obligations which it lays us under; and to affect an entire independence of that civil state, which protects us in all our rights, and gives us every other liberty, that only excepted of despising the laws of the community.

In order to encounter the growing evil of the papal usurpations in England, the legislature were led to frame the statutes of *præmunire*. King Edward I. a wise and magnanimous prince, set himself in earnest to shake off this servile yoke. He would not suffer his bishops to attend a general council, till they had sworn not to receive the papal benedic-

benediction. He made light of all papal bulls and processes: attacking Scotland in defiance of one; and seizing the temporalities of his clergy, who under pretence of another refused to pay a tax imposed by parliament. He strengthened the statutes of mortmain; thereby closing the great gulf, in which all the lands of the kingdom were in danger of being swallowed. And, one of his subjects having obtained a bull of excommunication against another, he ordered him to be executed as a traitor, according to the ancient law. And in the thirty-fifth year of his reign was made the first statute against papal provisions, being, according to sir Edward Coke, the foundation of all the subsequent statutes of *præmunire*; which we rank as an offence immediately against the king, because every encouragement of the papal power is a diminution of the authority of the crown.

In the weak reign of Edward II. the pope again endeavoured to encroach, but the parliament manfully withstood him; and it was one of the principal articles charged against that unhappy prince, that he had given allowance to the bulls of the see of Rome. But Edward III. was of a temper extremely different; and, to remedy these inconveniences first by gentle means, he and his nobility wrote an expostulation to the pope: but receiving a menacing and contemptuous answer, withal acquainting him, that the emperor, (who a few years before at the diet of Nuremberg, A. D. 1323, had established a law against provisions,) and also the king of France had lately submitted to the holy see; the king replied, that if both the emperor and the French king should take the pope's part, he was ready to give battle to them both, in defence of the liberties of the crown. Hereupon more sharp and penal laws were devised against provisors, which enact severally, that the court of Rome shall not present or collate to any bishopric or living in England; and that whoever disturbs any patron in the presentation to a living by virtue of a papal provision, such provisor shall pay fine and ransom to the king at his will, and be imprisoned till he renounces such provision: and the same punishment is inflicted on such as cite the king, or any of his subjects, to answer in the court of Rome. And when the holy see resented these proceedings, and pope Urban V. attempted to revive the vassalage and annual rent to which king John had subjected his kingdom, it was unanimously agreed by all the estates of the realm in parliament assembled, (40 Edw. III.) that king John's donation was null and void, being without the concurrence of parliament, and contrary to his coronation oath: and all the temporal nobility and commons engaged, that if the pope should endeavour by process or otherwise to maintain these usurpations, they would resist and withstand him with all their power.

In the reign of Richard II. it was found necessary to sharpen and strengthen these laws, and therefore it was enacted by statutes 3 Ric. II. c. 3. and 7 Ric. II. c. 12. first, that no alien should be capable of letting his benefice to farm; in order to compel such, as had crept in, at least to reside on their preferments: and, afterwards, that no alien should be capable to be presented to any ecclesiastical preferment, under the penalty of the statutes of provisors. By the statute 12 Ric. II. c. 15. all liegemen of the king, accepting of a living by any foreign provision, are put out of the king's protection, and the benefice made void. To which the statute 13 Ric. II. st. 2. c. 2. adds banishment and forfeiture of lands and goods: and by c. 3. of the same statute, any person bringing over any citation or excommunication from beyond sea, on account of the execution of the foregoing statutes of provisors, shall be imprisoned, forfeit his goods and lands, and moreover suffer pain of life

and member. (See PRÆMUNIRE and PROVISOIRS.) At length, by the reformation in religion under Henry VIII. and his children, the usurped power of the pope was forever routed and destroyed, all his connections with this island were cut off, the crown restored to its supremacy over spiritual men and causes, and the patronage of bishoprics once more indisputably vested in the king. Blackst. Comment. vol. iv. See REFORMATION.

History mentions a pope's, Joan. The reality hereof has been opposed and defended by many learned men. The tradition might possibly take its rise from the weakness of pope John VIII. in restoring Photius to his communion, and owning him as true patriarch; for he hence got the appellation of woman; as that prince called *king Mary* did, by leaving himself to be governed by queen Mary his wife.

M. Spanheim, professor of theology at Leyden, has written very amply on the subject; and shews it to be a question *de facto*, scarcely determinable at this time of day.

POPE, in *Ornithology*, a name by which the people in many parts of England call the *anas arctica clusii*. See PUFFIN.

POPEDOM, or PAPACY, in *Ecclesiastical History*, denotes the office and jurisdiction of the pope.

POPELNESS, in *Geography*, a cape on the N. coast of the island of Yell. N. lat. 61° 6'. W. long. 1° 14'.

POPENREUF, a town of Germany, in the territory of Nuremberg; three miles N.W. of Nuremberg.

POPERINGHE, a town of France, in the department of the Lys, and chief place of a canton, in the district of Ypres; six miles W. of Ypres. The place contains 7967, and the canton 10,485 inhabitants, on a territory of 65 kilometres, in 3 communes.

POPERY, in *Ecclesiastical History*, comprehends the religious doctrines and practices, said to be adopted and maintained by the church of Rome. The following summary, extracted chiefly from the decrees of the council of Trent, continued under Paul III., Julius III., and Pius IV., from the year 1545 to 1563, by successive sessions, and the creed of pope Pius IV. subjoined to it, and bearing date November 1564, may not be unacceptable to the reader. One of the fundamental tenets, strenuously maintained by popish writers, is the infallibility of the church of Rome; though they are not agreed, whether this privilege belongs to the pope, or a general council, or to both united; but they pretend that an infallible living judge is absolutely necessary to determine controversies, and to secure peace in the Christian church. However, Protestants allege, that the claim of infallibility in any church is not justified by the authority of scripture; much less does it pertain to the church of Rome; and that it is inconsistent with the nature of religion, and the personal obligations of its professors; and that it has proved ineffectual to the end for which it is supposed to be granted, since popes and councils have disagreed in matters of importance, and they have been incapable, with the advantage of this pretended infallibility, of maintaining union and peace. For the manner in which this claim is understood, and maintained by modern Catholics, see POPE and PAPIST.

Another essential article of the popish creed is the supremacy of the pope, or his sovereign power over the universal church. On this subject it is maintained, that every Christian, under pain of damnation, is bound to be subject to the pope; that no appeals may be made from him; and that he alone is the supreme judge of all persons, in all ecclesiastical causes, but that he himself can be judged by no man. To this purpose they assert, that the church of Rome

is the Catholic church; the mother and mistress of all churches; that the pope is the vicar of Christ, successor of St. Peter, and the supreme pastor over all the world. And they likewise assert his dominion over temporal princes; pretending that he may over-rule what they command; excommunicate and depose them, if they contradict his commands; and absolve their subjects from allegiance, and exempt the clergy from their jurisdiction.

This exorbitant power hath been challenged by the pope for many successive ages, and in several instances actually exercised. Thus Gregory VII. excommunicated the emperor Henry IV. and gave away his kingdoms to Rudolphus, duke of Sweden. Gregory IX. excommunicated the emperor Frederick II. and absolved his subjects from their oath of allegiance. Pope Paul III. excommunicated and deposed Henry VIII. king of England, and commanded all his subjects, under a curse, to withdraw their obedience from him. Pope Pius V. and Gregory XIII. damned and deposed queen Elizabeth, and absolved her subjects from their allegiance. And this practice has been warranted by the decree of the third Lateran council under pope Alexander III., and by the fourth Lateran council under pope Innocent III., though it is contrary to the express language of scripture, to the doctrine and conduct of the apostles and primitive fathers, and to the confessions and practice of the ancient bishops of Rome, and altogether inconsistent with the rights of government and the welfare of society. For the sentiments of modern Catholics with regard to this article, we refer to the article PAPIST.

Farther, the doctrine of the seven sacraments is a peculiar and distinguishing doctrine of the church of Rome: these are baptism, confirmation, the eucharist, penance, extreme unction, orders, and matrimony. The council of Trent (sess. 7. can. 1.) pronounces an anathema on those who say, that the sacraments are more or fewer than seven, or that any one of the above number is not truly and properly a sacrament. And yet it does not appear that they amounted to this number before the twelfth century, when Hugo de St. Victore and Peter Lombard, about the year 1144, taught, that there were seven sacraments. The council of Florence, held in 1438, was the first council that determined this number. These sacraments confer grace, according to the decree of the council of Trent (sess. 7. can. 8.) *ex opere operato*, or by the mere administration of them: three of them, *viz.* baptism, confirmation, and orders, are said (can. 9.) to impress an indelible character, so that they cannot be repeated without sacrilege; and the efficacy of every sacrament depends on the intention of the priest by whom it is administered (can. 11.) Pope Pius expressly enjoins, that all these sacraments should be administered according to the received and approved rites of the Catholic church. With regard to the eucharist in particular, we may here observe, that the church of Rome holds the doctrine of *transubstantiation*; the necessity of paying divine worship to the consecrated bread, or *host*; the propitiatory sacrifice of the mass, according to their ideas of which Christ is truly and properly put to death as a sacrifice, as often as the priest says mass; and *solitary mass*, in which the priest alone, who consecrates, communicates; and allows *communion* only in one kind, *viz.* the bread, to the laity. Sess. 14. See PAPIST.

The doctrine of *merit* is another distinguishing tenet of popery; with regard to which the council of Trent has expressly decreed (sess. 6. can. 32.), that the good works of justified persons are truly meritorious; deserving not only an increase of grace, but eternal life, and an increase of glory; and it has anathematized all who deny this doctrine.

Of the same kind is the doctrine of satisfactions; which supposes that penitents may truly satisfy, by the afflictions they endure under the dispensations of Providence or by voluntary penances to which they submit, for the temporal penalties of sin, to which they are subject, even after the remission of their eternal punishment. Sess. 6. can. 30. and sess. 14. can. 8 & 9. See PAPIST.

In this connection we may mention the popish distinction of venial and mortal sins: the greatest evils arising from the former are the temporary pains of purgatory; but no man, it is said, can obtain the pardon of the latter without confession to a priest, and performing the penances which he imposes.

The council of Trent (sess. 14. can. 1.) has expressly decreed, that every one is accursed, who shall affirm, that *penance* is not truly and properly a sacrament instituted by Christ in the universal church, for reconciling those Christians to the divine majesty, who have fallen into sin after baptism: and this sacrament, it is declared, consists of two parts, the matter and the form: the matter is the act of the penitent, including contrition, confession, and satisfaction; the form of it is the act of absolution on the part of the priest. Accordingly it is enjoined, that it is the duty of every man, who hath fallen after baptism, to confess his sins, once a year at least, to a priest; that this confession is to be secret; for public confession is neither commanded nor expedient; and that it must be exact and particular, including every kind and act of sin, with all the circumstances attending it. When the penitent has so done, the priest pronounces an absolution, which is not conditional or declarative only, but absolute and judicial. This secret, or auricular confession, was first decreed and established in the fourth council of Lateran, under Innocent III. in 1215 (cap. 21). And the decree of this council was afterwards confirmed and enlarged in the council of Florence, and in that of Trent, which ordains, that confession was instituted by Christ; that by the law of God it is necessary to salvation; and that it has been always practised in the Christian church. As for the penances imposed on the penitent, by way of satisfaction, they have been commonly the repetition of certain forms of devotion, as pater-nosters, or ave-marias, the payment of stipulated sums, pilgrimages, fasts, or various species of corporal discipline. But the most formidable penance in the estimation of many, who have belonged to the Romish communion, has been the temporary pains of purgatory. But under all the penalties which are inflicted or threatened in the Romish church, it has provided relief by its indulgences, and prayers or masses for the dead; performed professedly for relieving and rescuing the souls that are detained in purgatory. Sess. 25. See PAPIST.

Another article that has been long authoritatively enjoined and observed by the church of Rome, is the celibacy of her clergy. This was first enjoined at Rome by Gregory VII. about the year 1074, and established in England by Anselm, archbishop of Canterbury, about the year 1105; though his predecessor Lanfranc had imposed it upon the prebendaries and clergy that lived in towns. And though the council of Trent was repeatedly petitioned by several princes and states to abolish this restraint, the obligation of celibacy was rather established than relaxed by this council; for they decreed, that marriage contracted after a vow of continence is neither lawful nor valid; and thus deprived the church of the possibility of ever restoring marriage to the clergy. For if marriage, after a vow, be in itself unlawful, the greatest authority upon earth cannot dispense with it, nor permit marriage to the clergy, who have al-

ready vowed continence. Sess. 24. can. 9. (See CELEBATE, and PAPIST.) To the doctrines and practices above recited may be farther added the worship of images: to justify which, the papists often leave the second commandment out of their catechisms (see DECALOGUE); the invocation of saints and angels, with respect to which the council of Trent decreed, that all bishops and pastors, who have the cure of souls, do diligently instruct their flocks, that it is good and profitable humbly to pray unto the saints, and to have recourse to their prayers, help, and aid; for which practice no scripture command or example, nor any testimony within the first three hundred years after Christ, can be pleaded: the worship of sacred relics, by which they understand not only the bodies and parts of the bodies of the saints, but any of those things that appertained to them, and which they touched; and the celebration of divine service in an unknown tongue, to which purpose the council of Trent hath denounced an anathema on any one who shall say, that mass ought to be celebrated only in the vulgar tongue. (Sess. 25. and sess. 22. can. 9.) Though the council of Lateran under Innocent III. in 1215 (can. 9.) had expressly decreed, that, because in many parts, within the same city and diocese, there are many people of different manners and rites mixed together, but of one faith, the bishops of such cities or dioceses should provide fit men for celebrating divine offices, according to the diversity of tongues and rites, and for administering the sacraments. See PAPIST.

We shall only add, that the church of Rome maintains, that unwritten traditions ought to be added to the holy scriptures, in order to supply their defect, and regarded as of equal authority; that the books of the Apocrypha are canonical scripture; that the Vulgate edition of the bible is to be deemed as authentic; and that the scriptures are to be received and interpreted according to that sense, which the holy mother church, to whom it belongs, to judge of the true sense, hath held, and doth hold, and according to the unanimous consent of the fathers. Sess. 4. See INDEX.

Such are the principal and distinguishing doctrines of popery, most of which have received the sanction of the council of Trent; and that of the creed of pope Pius IV. which is received, professed, and sworn to by every one, who enters into holy orders in the church of Rome; and at the close of this creed we are told, that the faith contained in it is so absolutely and indispensably necessary, that no man can be saved without it. Hardouin's Concil. tom. x. p. 1—211.

Many of the doctrines of popery were relaxed, and very favourably interpreted by M. de Meaux, bishop of Condom, in his exposition of the Doctrine of the Catholic Church, first printed in the year 1671; but this edition, which was charged with perverting, in endeavouring to palliate the doctrine of the church, was censured by the doctors of the Sorbonne, and actually suppressed: nor does it appear, that they ever testified their approbation, in the usual form, of subsequent and altered editions. See the examination of this work by archbishop Wake, in the Pre-servative against Popery, vol. iii. p. 3—112.

For the articles of faith and discipline avowedly maintained by modern Catholics, and particularly by those of our own country, we refer to the title PAPIST; observing, that no tenets ought to be charged on any body of Christians, which they do not expressly acknowledge and avow, and much less any, which they solemnly renounce and disavow.

POPERY, *Declaration against*. See DECLARATION.

POPERY, *Laws against*. See PAPIST, MASS-books, PARENTS, PRÆMUNIRE, and TOLERATION.

POPIGAN, in *Geography*, a river of Russia, which rises in N. lat. 68° 40'. E. long. 101° 14', and runs into the Chatanga at Popiganskoi.

POPIGANSKOI, an ostrog of Russia, in the government of Tobolsk, on the Chatanga. N. lat. 72°. E. long. 100° 14'.

POPILIUS, in *Biography*, a name common to many eminent Romans, of whom the most celebrated is Lænas, a Roman ambassador to Antiochus, king of Syria. He was commissioned to order the monarch to abstain from hostilities against Ptolemy, king of Egypt, who was the ally of Rome. Popilius put many questions to the monarch, who wished to evade any direct answers; but Popilius, with a stick in his hand, made a circle in the sand on which Antiochus stood, and bade him, in the name of the Roman senate and people, not to go beyond it before he had given decisive answers. This boldness had the desired effect: Antiochus withdrew his garrisons from Egypt, and no longer thought of making war upon Ptolemy.

POPLAR, in *Botany*. See POPULUS.

POPLAR Tree, in *Agriculture*, a well-known sort of tree of the willow kind, of which there are several species, that are proper to introduce as ornamental and timber trees, as may be seen under the head POPULUS, in *Gardening*.

To marshy grounds no trees are better adapted than poplars, especially the first three or four sorts, noticed in that place, all of which thrive remarkably in moist situations. And as forest or timber trees, the white, black, tremulous, and Lombardy poplars, are proper to be employed. Marshy lands are capable of being improved to much advantage by coppices of these trees, to cut every four, five, or six years, for poles and other small purposes; being planted in rows a yard asunder, and in seven years they will be fit to cut for many small uses, and the stools shooting up again strong, afford a cutting every four or five years afterwards. And some of the sorts may also be planted occasionally to form hedges in moist or other situations, more particularly the Lombardy poplar, as this sort is peculiar in branching out numerously from the bottom upwards, and may be planted hedge fashion along the sides, or top of outward watery ditches, in large plants, so as at once to form a hedge; they may be topped to five, six, or seven feet in height.

Some think, that when these trees are to be propagated by cuttings, it is best to do it in February, cutting off large truncheons of eight or ten feet long; which, being thrust down a foot deep in the ground, will take root very quickly, and, if the soil be moist, will grow to a considerable size in a few years.

The black poplar is not so easily raised from these large truncheons, but should be planted in cuttings of about a foot and a half long, planting them a foot deep in the ground. This will grow on almost any soil, but does much better on a moist one than on any other. They are the fittest of all trees for raising a shade quickly, as they will grow fourteen feet in height sometimes in one season, and in four or five years will be large trees.

A considerable advantage may be obtained by planting these trees upon moist boggy soils, where few other sorts will thrive; and many places of this nature there are in this country, which do not, at present, bring in any money to their owners; whereas if they were planted with these trees, they would in a very few years more than purchase the ground, and clear off all expence: but there are many persons, who think nothing except corn worth cultivating:

tivating: or, if they plant timber, it must be oak, ash, or elm; and if their land be not proper for either of these, it is deemed of little worth; whereas if the nature of the soil was examined, and proper sorts of plants adapted to it, there might be a very great advantage made of several large tracts of land, which at this time lie neglected.

The wood of these trees, especially of the white, is very good to lay for floors, where it will last many years; and, for its exceeding whiteness, is by many persons preferred to oak; but being of a soft contexture, is very subject to take the impression of nails, &c. which renders it less proper for this purpose: it is also very proper for wainscoting of rooms, being less subject to swell or shrink than most other sorts of woods; but for turnery ware, there is no wood equal to this for its exceeding whiteness, so that trays, bowls, and many other utensils, are made of it; and the bellows-makers prefer it for their use; as do also the shoemakers, not only for heels, but also for the soles of shoes: it is also very good to make light carts: the poles are very proper to support vines, hops, &c. and the loppings will afford good fuel, which in many countries is much wanted. They also answer very well for hurdle-wood.

There are several species or varieties capable of being cultivated with advantage, as has been seen; as the white poplar, the trembling poplar or aspen, the black poplar, the Lombardy poplar, the common Tacamahaca poplar, the heart-leaved Tacamahaca poplar, the smooth poplar, the Canadian poplar, and the Carolina poplar; but the three or four first are the sorts most commonly made use of for the purposes of agriculture.

All the sorts are capable of being readily increased by cuttings, layers, and suckers. But the planting of the cuttings is the most expeditious mode, as they grow freely without any trouble; when made either from the young year old shoots, a foot and a half in length, and planted a foot in depth; or large truncheons of two, three, or more years growth, from about a yard to five or six feet long, planted in moist places as we have mentioned above; though these large cuttings or truncheons are not proper for general plantations only in some particular parts, as in a marshy or watery situation, where shade, shelter, &c., may be required as soon as possible, in which they may be planted finally to remain, putting them in to the depth of one or two feet. But in order to raise plants for regular plantations or for handsome standards, it is the best method to raise them principally from young cuttings of one year's growth, or two at most. These young cuttings should be made about fifteen or eighteen inches long, and planted out in nursery rows two feet asunder, placing each cutting two parts or half way in the ground, and about a foot distant in the lines, they readily take root, and make good shoots the following summer, care being taken to trim off the straggling laterals in order to encourage the leading shoots to grow straight and rise more expeditiously in height: after having had from two to four or five years' growth in this situation, they may be finally removed for the purposes for which they are wanted at the proper season. The layers may be laid down in autumn, choosing the lower young shoots, that are conveniently situated, laying them by flat laying. They will be well rooted, and fit to remove by the autumn following into nursery-rows, to have two or three years' growth. And suckers, which some of the sorts send up in abundance from the roots, as the fifth sort, may be taken off after the fall of the leaf, and be planted in nursery-rows, as directed for the cuttings, where they form good plants in two or three years. See **POPULUS**.

The Lombardy poplar is said to be esteemed the most profitable tree that can be planted, in several parts of the west of England; particularly in Shropshire, where it is erroneously called the Italian poplar. When introduced sparingly, and in particular circumstances and situations, as near buildings, or backed by other trees, it is, Mr. Loudon thinks, highly ornamental. When opposed to the sky, it has commonly a meagre effect. The peculiarity of its shape may be varied at pleasure, by placing scandent plants or creepers near it, which may climb up among its branches, and hang round it in irregular masses. In many places a number of these trees may be seen varied in this way with an excellent effect. The Carolina, the Canadian, and the hoary poplars, are trees of very agreeable forms. In a tolerably good soil, they grow with great rapidity; frequently upwards of six feet in a season, and seldom less than three or four feet, until they become twelve or fourteen years of age. In forming a residence, they may in most cases be used, he supposes, with great advantage; as they will not only shelter the other sorts of trees, but give the whole estate or park a wooded appearance within a year or two after planting. The hoary poplar, in this respect, is particularly to be recommended. Its effects may be seen to advantage in some small places in Scotland, though it has not been long known there. Those of the Canadian and Carolina poplars are likewise visible in some other places in England. And they have been taken advantage of in some other situations and instances of ornamenting residences.

POPLAR Galls. The black poplar is famous among naturalists for producing a sort of galls, or protuberances of various shapes and sizes, on its leaves and branches, which have been usually mistaken for the lodgments of worms hatched from the eggs of an ichneumon fly; but they are in reality produced from the operations of a viviparous insect, called the *pucceron*, for the bringing up of its offspring.

These galls are of the bladder kind, being usually skinned over, and more or less hollow within, not woody, as those of the oak, &c. They proceed from different parts of the plant, some from the pedicles of the leaves, and many from the young shoots; they are very various in figure, some being roundish, others oblong, others crooked, and contorted in various directions, and some of them are in the figure of horns, like those of the turpentine-tree, and of the same origin.

POPLAR, in *Geography*, a hamlet of Stepney. See **STEPNEY**.

POPLAR Creek, a river of America, in the state of Tennessee, which runs into the Clinches, N. lat. 36° 2'. W. long. 84° 10'.—Also, a river of Maryland, which runs into the Patomack, N. lat. 38° 16'. W. long. 76° 42'.

POPLAR Island, an island in Chesapeake bay, about 10 miles in circumference. N. lat. 38° 45'. W. long. 76° 28'.

POPLAR Spring, a town in the N.W. part of Ann Arundel county, in the state of Maryland; 27 miles W. of Baltimore. The whole county of Ann Arundel contains 26,668 inhabitants.

POPLES, in *Anatomy*, the ham, or space at the back of the leg, behind and above the knee. This space is defined by the tendons of two of the flexors of the knee; viz. the biceps and semitendinosus, which are called respectively the outer and inner hamstrings.

POPPLICANI, **POPULICANI**, or *Publicani*, a name given in the West to the Manichees; or rather to a particular branch of them, called in the East Paulicians.

POPLIFUGIA, in *Antiquity*. See **FUGALIA**.

POPLIN, in *Geography*, a township of America, in New Hampshire,

Hampshire, Rockingham county, 12 miles W. of Exeter; incorporated in 1764, and containing 462 inhabitants.

POPLIN, a town of Prussia, in Pomerelia; 12 miles S.W. of Marienburg.

POPLITEAL, in *Anatomy*, (from *poples*, the ham,) an epithet applied to some parts situated in the ham, as the artery, vein, and nerve of the lower limb.

POPLITEAL *Aneurysm*, in *Surgery*. See ANEURYSM.

POPLITEUS, in *Anatomy*, (poplito-tibien,) a small muscle situated deeply in the upper and back part of the leg, and extending from the tuberosity of the external condyle of the femur to the back of the tibia. Its form is nearly triangular, so that we may describe in it two surfaces, two edges, a basis, and an apex.

The posterior surface is covered by the gastrocnemius, the plantaris, the popliteal vessels, and posterior tibial nerve. The anterior surface is attached to the back of the tibia, from the upper extremity as far as the oblique line, which traverses the bone from side to side. This surface also covers the upper end of the tibialis posticus, and the peroneo-tibial articulation. The lower edge is the longest, and slants from above downwards, and from without inwards. Its upper part is connected to the upper extremity of the fibula and the soleus muscle by a thin membrane: in the rest of its extent, it is attached to the oblique line of the tibia. The upper edge slants from above downwards and inwards: at the outside it is connected to the capsule of the knee; at the inside, to the back of the upper extremity of the tibia. The apex of the muscle, turned upwards and outwards, is fixed to a depression in the outer surface of the external condyle of the femur, below the attachment of the external lateral ligament of the knee. The basis is attached to about the upper fourth part of the inner edge of the tibia.

The popliteus is tendinous and fleshy: its tendon, attached to the femur, is flattened, and more than an inch in length. The back of this tendon is covered by the external lateral ligament of the knee and the tendon of the biceps. Its anterior surface is contiguous to the external condyle, to the convex edge of the external femilunar cartilage, which is slightly excavated to receive it, and to the back of the knee joint. The edges are closely united to the capsule of the joint. This part of the tendon in short forms a part of the internal surface of the knee. The back of the muscle is covered in nearly its whole extent by an aponeurosis, chiefly produced by the tendon of the femimembranosus. The fleshy fibres rise from the tendon first mentioned, and terminate in this aponeurosis, and in the surface of the tibia. The upper ones are the shortest and nearly transverse: they become longer and more oblique as we go lower.

It bends the knee joint, either by moving the leg on the thigh, or *vice versa*; when the knee is bent, it draws the inner edge of the tibia backwards, and thus rotates that bone on its axis, so as to turn the front of the foot inwards.

POPO, in *Geography*, a town of Peru, in the jurisdiction of Oruro, situated near a mountain celebrated for its mines; 16 miles N.E. of Paria.

POPO, or *Papa*, a kingdom of Africa, on the Slave coast, about 24 miles in extent; the soil of which is flat and sandy, without hills or trees.

POPO, *Grand*, a town of Africa, on the Slave coast, situated near the sea, in a fertile soil, at the mouth of a river which comes from the country of Ardra. N. lat. 6° 22'. E. long. 1° 5'.

POPO, *Little*, a town of Africa, on the sea-coast, not far from Grand Popo. N. lat. 6° 18'. E. long. 0° 40'.

POPOCATAPEC, a town of Mexico Proper; 36 miles S.E. of Mexico.

POPOLI, a town of Naples, in Abruzzo Citra; seven miles N.N.W. of Sulmona. N. lat. 42° 10'. E. long. 13° 45'.

POPORNICA, a town of European Turkey, in Moldavia; 36 miles N.E. of Stephanowzc.

POPORTZIE, a town of Lithuania; 12 miles N.W. of Troki.

POPOVITZ, a town of Bosnia; 10 miles N. of Bosnaferai.

POPPE, a town of Prussia, in Oberland; 17 miles E. of Ortelsburg.—Also, a town of Austria; eight miles S. of Bohmisch Waidhoven.

POPENDORF, a town of the duchy of Stiria; 10 miles N.N.E. of Rackesburg.

POPSETS, pieces of fir-baulk or other timber, fixed perpendicularly under the ship's bottom, upon the bildgeways, at the foremost and aftermost parts of the ship, to support her in launching.

POPSETS, the two upright pieces of elm or harder wood, cut with a screw at their lower ends, having holes in their head or upper end to admit levers. See SCREW.

POPPINA, in *Geography*, a town of European Turkey, in Bulgaria; 17 miles S.W. of Dristra.

POPPL, a term sometimes applied to the weed cockle. It is very injurious among grain.

POPPOSORI, in *Geography*, a town of Naples, in the province of Otranto; three miles S.W. of Oris.

POPPY, in *Botany* and *Gardening*. See PAPAVER.

POPPY, in the *Materia Medica*. (See OPIUM.) The seeds of the *white poppy*, or *papaver somniferum*, possess, according to some authors, a narcotic power; but for this opinion, says Dr. Woodville, there is no foundation: they consist of a simple farinaceous matter united with a bland oil, and in many countries are eaten as food. As a medicine they have been usually given in the form of emulsion, in catarrhs, stranguries, &c. The heads or capsules of the poppies, which are directed for use in the pharmacopeias, like the stalks and leaves, have an unpleasent smell, resembling that of opium, and an acrid bitterish taste. Both the smell and taste reside in a milky juice, which more especially abounds in the cortical part of the capsules, and in its concrete state constitutes the officinal opium. These capsules are powerfully narcotic or anodyne; boiled in water, they impart to the menstruum their narcotic juice, together with the other juices which they have in common with vegetable matters in general. The liquor, strongly pressed out, suffered to settle, clarified with whites of eggs, and evaporated to a due consistence, yields an extract, which is about one-fifth or one-sixth of the weight of the heads. This possesses the virtues of opium, but requires to be given in double its dose to answer the same intention, which it is said to perform without occasioning a nausea and giddiness, the usual effects of opium. See the sequel to this article. White poppy heads are also used externally in fomentations, either alone, or more frequently added to the "decoctum pro fomento." The officinal preparations of the poppy capsules are as follow.

Decoctum papaveris, decoction of poppy, which the London Pharmacopeia directs to be prepared by boiling four ounces of the capsules bruised in four pints of water for a quarter of an hour, and then straining. In making this decoction the seeds should not be rejected, as they contain a considerable quantity of bland oil; which, added to the mucilage and narcotic principle of the capsules, increases the emollient qua-

lity of the decoction. This is a very useful fomentation in painful swellings, and in the excoriations produced by the thin acrid discharge of ulcers, and those common to infants.

Extractum papaveris of the Lond. Pharm. and *Extractum papaveris somniferi* of the Edinb. Ph., extract of poppies, is prepared by macerating a pound of the capsules bruised in a gallon of boiling water for twenty-four hours; then boiling down to four pints, straining the hot liquor, and evaporating it to a proper consistence. This, as we have already observed, possesses nearly the same properties as opium, but in a much weaker degree; and as it is less apt to occasion the nausea, headache, and delirium, occasionally produced by opium, it is to be preferred for procuring sleep in diseases that much affect the head. The dose is from grs. ij to ℥j, given in the form of pills. This extract was first recommended by Mr. Arnot. Edinb. Med. Ess. and Obs. vol. v. art. 11.

Syrupus papaveris, syrup of poppy, is prepared, according to the directions of the London Pharm., by macerating four ounces of the dried capsules of the poppy, bruised and freed from the seeds, in two gallons and a half of boiling water for twelve hours; then boiling it down in a water bath to one gallon, and strongly expressing it; boiling the liquor again down to two pints, and straining it while it is hot; setting it aside for twelve hours that the feces may subside; then boiling down the clear liquor to one pint, and adding two pounds of refined sugar, in the manner ordered for making syrup.

The *Syrupus papaveris somniferi*, syrup of white poppy, of Edinb. Ph., is prepared by macerating two pounds of the sliced capsules of the white poppy, dried and freed from the seeds, in thirty pounds of boiling water for twelve hours; then boiling until a third part only of the liquor remains, and having expressed strongly, straining the decoction; boiling the strained liquor to one-half, and again straining it: and lastly, having added four pounds of refined sugar, boiling it for a short time so as to form a syrup.

The *Syrupus papaveris albi*, syrup of white poppy, of the Dub. Ph., is directed to be prepared in the following manner: Take of the capsules of the white poppy, gathered before they are ripe, dried and freed from their seeds, a pound; boiling water three pints. Slice and bruise the capsules; then pour over them the water, and macerate for twelve hours; express the liquor and evaporate it by a gentle heat to a pint; strain through a linen cloth, and set it aside six hours that the feces may subside; finally add sugar to the liquor that it may make a syrup.

The syrup may be conveniently prepared from the extract of the Edinb. Ph. by dissolving one dram in two pounds and a half of simple syrup. This syrup ferments more readily than most other syrups, and loses its narcotic power when it becomes acefcent. One fluid-ounce of it contains about one grain of extract. Syrup of poppy is an useful anodyne for allaying the violence of the cough in catarrh, for easing pain and procuring sleep in the diseases of children. The dose is from fʒj to fʒj, according to the age of the patient.

The capsules of the red or corn poppy, *papaver Rhæas* or *erraticum*, common in corn-fields, like those of the *somniferum*, contain a milky juice of a narcotic quality, but the quantity is very inconsiderable, and has not been applied to any medical purpose; but an extract prepared from them has been successfully employed as a sedative.

It has been the general opinion of authors, that the narcotic quality of the red poppy lay in its flowers; but Mr. Boulduc, in his course of experiments for the finding out an European plant which should yield us a juice of the nature

of the opium of the East, without its bad effects, found that the virtue of this plant, which is very great, lay much more in the heads than the flowers; and from four ounces of these heads, while fresh and green, he obtained five drams of a solid extract, of the nature of opium, two, three, or four grains of which were a full dose, and which possessed the virtues of opium, and might be given with great success and safety in obstinate coughs and other such cases. Hist. Acad. Par. 1712.

Fouquet of Montpellier prefers this extract to opium. See Murray, App. Med. vol. ii. p. 213.

The flowers of the red poppy have somewhat of the smell of opium, and a mucilaginous taste, accompanied with a slight degree of bitterness. The officinal preparation is a syrup, called *syrupus Rhæados* in the London Pharm. This syrup of the red poppy is prepared in the following manner: Take of the recent petals of the red poppy, a pound; boiling water a pint and two fluid-ounces; refined sugar, one pound and a half. To the water, heated in a water bath, add gradually the petals of the red poppy, stirring them occasionally; then, having removed the vessel, macerate for twelve hours; press out the liquor, and set it aside that the impurities may subside; lastly, add the sugar as in making syrup. The *syrupus papaveris erratici*, or syrup of the red poppy, of the Dub. Pharm., is prepared as follows: Take of the first petals of the red poppy, a pound; boiling water, twenty fluid-ounces; add the flowers gradually to the boiling water; then having removed the vessel from the fire, macerate in a lower heat for twelve hours; express the liquor, and set it aside that the feces may subside; finally, let the sugar be added, so as to make a syrup. By pursuing exactly either of the above processes, the petals yield their fine rich colour, for which the syrup has been principally, and as some say only, valued. However, this syrup has been thought useful by some as an anodyne and pectorant, and is, therefore, prescribed in coughs and catarrhal affections. Woodville, Med. Bot. Thomson's Lond. Dispensatory.

POPPY, in Agriculture. The common red poppy, or *papaver erraticum*, is one of the most troublesome and mischievous weeds the farmers are plagued with among their corn, and it is the most difficult to thoroughly destroy of almost any other. Its seeds will lie a long time in land unploughed, without ever shooting: but they will be sure to grow with the first crop of corn. Mr. Tull gives an instance of the seeds of this plant being buried four and twenty years in a field of saintfoin, and at the end of that time, the land being ploughed for wheat, they all grew up among the corn, though they had laid dormant so long before.

POPPY, Horned. See CHELIDONIUM *Majus*.

The yellow horned poppy, called by authors *papaver corniculatum luteum*, is one of those vegetable poisons of our own growth, which may be very mischievous by their not being generally known or suspected to be so. We have an account of the strange effects of this plant in the Philosophical Transactions, in an instance of a family in Cornwall, who eat of a pye made of the roots of this instead of those of eryngo, or sea-holly, which it is the custom of the poorer people there to make into a coarse sort of pye for their food. See Phil. Trans. N^o 242.

POPPY, Prickly. See ARGEMONE.

POPPY, Spatling, a species of the cucubalus, or berry-bearing chick-weed. This stands in the catalogue of medicinal plants under the title of *behen album*. See BEN.

POPPY-Seeds. The poppy-seed is of a more delicious taste than sweet almonds; it is oily and farinaceous. Dr. Allston says, he has eaten large quantities of the black as well as the

white seed, and never found it somniferous or noxious. See Med. Ess. Edinb. vol. v. art. 12.

If emulsions of poppy-seeds have been found serviceable in coughs, catarrhs, heat of urine, and other like disorders, their virtue is to be ascribed not to an anodyne, but an emollient quality.

These seeds are used in food in some places, as is their expressed oil, which is as wholesome as olive-oil. Vide Matthiol. p. 476. Geoffr. Mat. Med. vol. ii. p. 713.

The qualities and uses of this oil, with regard to painting, are much the same as those of nut-oil; only when it is perfectly good, it is more clear and limpid, and will dry better than the best oil of that kind.

POPPY, *Syrup of*. See MECONIUM, and POPPY, *supra*.

POPPY *Water*. See WATER.

POPRA, in *Geography*. See JUNKSEILON.

POPRA, a river which rises in Hungary, and runs into the Vistula, about 20 miles below Cracow.

POPULAGO, in *Botany*, Tournefort's name for the *CALTHA* of Linnæus; see that article.

POPULAR, POPULARIS, something that relates to common people.

The Roman nobility was distinguished into two factions; the *optimates*, who adhered strenuously to the ministry, the senate, &c. in opposition to the people; and the *populares*, who favoured the rights and pretensions of the people, in opposition to the noblesse.

POPULAR *Action*. See ACTION.

POPULAR *Diseases*, are such as become common, and run through the body of the people; called also *endemic* and *epidemic* diseases.

Hippocrates has written expressly "De Morbis Popularibus."

POPULAR *Errors*, are such as people imbibe from one another, by custom, education, and tradition, without having considered the reason or foundation of them.

POPULARIA, among the Romans, were steps or places where the people sat and beheld the games and horse-races.

POPULATION, in *Political Economy*. The state of a country, with respect to the number of its inhabitants, is of great importance in the science of political economy. The increase or diminution of the members of a state has at all periods been thought an object deserving the attention of governments, though very different theories have been formed on the subject. Some ancient nations adopted regulations to prevent any considerable augmentation of the number of its citizens; but in modern times it has generally been thought the part of a wise policy to encourage population as essential to the strength and prosperity of a state. Positive regulations against an increase of population are always nugatory: it is, without contradiction, limited in every country by the means of subsistence; and if ever it actually passes this barrier, it must in a very short time be restored to its former level. So long as there is a facility of subsistence, the people will be encouraged to early marriages, and to the augmentation of the national stock of inhabitants. On this subject, Dr. Adam Smith, in explaining the causes which proportion the reward of labour to the extent of the funds for its support, observes, "It is in this manner that the demand for men, like that of any other commodity, necessarily regulates the production of men; quickens it when it goes on too slowly, and stops it when it advances too fast. It is this demand which regulates and determines the state of population in all the different countries of the world,—in North America, in Europe, and in China; which renders it rapidly progressive in the first, slow

and gradual in the second, and altogether stationary in the last." This passage is said to have given rise to the celebrated work of Mr. Malthus, to which we shall shortly have occasion to refer, and the idea contained in it is illustrated and confirmed by a multitude of indisputable facts collected from almost every country on the globe. In the American states the inhabitants, particularly those engaged in agriculture, congratulate themselves upon the increase of their families, as upon a fresh accession of wealth; for the labour of their children, even in an early stage, soon redeems, and will quickly repay, with ample interest, the expence and trouble of rearing them. In such countries the wages of the labourer are high, for the number of labourers bears no proportion to the demand. Whereas, in many European countries, a large family too frequently entails upon the parents poverty and wretchedness.

In contemplating this interesting subject, it will be discovered that the rate of population is by no means the same in all countries:—there is, for instance, a striking difference in its progress, not only in North America, to which we have just alluded, compared with Europe and Asia in general, but a similar difference is exhibited in the different states of Europe, at the same period of time; and in the same state at different periods. As men cannot live without food, it will be readily admitted that these variations in the rate of population must have been universally preceded and accompanied by variations in the means of maintaining labourers, on which, indeed, the demand mentioned by Dr. Smith must depend. Where these funds are rapidly increasing, as in North America, the demand for an increasing number of labourers renders it easy to provide an ample subsistence for each, and the population of the country is observed to make rapid advances. Where these funds increase only at a moderate rate, as in most parts of Europe, there the demand for labourers is moderate, because the command of the labourer over the means of subsistence is consequently much diminished, and the population proceeds very slowly, varying in each country according to the variation in the funds for its support. Where these funds are stationary, as probably in China, Spain, Italy, &c., the demand for labour being stationary, the command of the labourer over the means of subsistence is comparatively scanty, and the population is diminishing rather than increasing.

It is no less certain, that the actual increase of the funds for the maintenance of labour does not depend simply upon the physical capacity of a country to produce food and other necessaries, but upon the degree of industry, intelligence and activity, with which these powers are at any particular period called forth. Thus we have seen or heard of countries possessing every requisite for producing the necessaries and conveniences of life in abundance, sunk in a state of ignorance and indolence from the vices of their governments, or the unfortunate constitution of their society, and continuing on for ages, with scarcely any increase in the means of subsistence, till some fortunate event introduces a better order of things; and then the industry of the nation being roused, and allowed to exert itself with more freedom, more ample funds for the maintenance of labour are immediately provided, and population is seen to make a sudden start forwards, at a rate wholly different from that at which it had before proceeded. An instance of this kind has been produced with regard to Russia, the population of which, though early inhabited, was so extremely low before the beginning of the last century, and has proceeded with such rapidity since the reigns of Peter the Great and Catharine II. It has also been noticed in the review of

the history of nations, that the waste of people occasioned by the great plagues, famines, and other devastations, to which the human race has been occasionally subject, has been repaired in a much shorter time than it would have been, if the population, after these devastations, had only proceeded at the same rate as before. From which circumstance it is obvious, that after the void thus occasioned, it must have increased much faster than usual; and the greater abundance of the funds for the maintenance of labour, which would be left to the survivors, indicates the usual conjunction of a rapid increase of the funds for its maintenance. A fact in proof of this is, that just after the pestilence in the reign of Edward III., a day's labour would purchase a bushel of wheat, while immediately before, it would scarcely have obtained a peck as a fair equivalent. Again, wherever any new channels of industry, and new sources of wealth are opened, so as to provide the means of supporting an additional number of labourers there, almost immediately a stimulus is given to population; and it proceeds, for a short time, with a vigour and celerity proportionate to the greatness and duration of the funds on which it alone can subsist.

It is certain that the greater the number of persons any country contains, the greater are the means it possesses of carrying on agriculture, manufactures, and commerce, and likewise of defending itself against any hostile attempts of other states: a high degree of population has therefore been generally considered as conducive to national prosperity and security, and almost every writer on political economy has assumed an increasing population as one of the principal objects which the internal regulations of a country should be calculated to promote. Mr. Malthus, in his "Essay on the Principle of Population," has taken a different view of the subject. He has endeavoured to shew that population invariably increases where the means of subsistence increase, unless prevented by some very powerful and obvious checks. He goes farther, and lays it down almost as an axiom, that there is a constant tendency in all animated life to increase beyond the nourishment prepared for it, and he traces to this source a very considerable portion of the vice and misery, and of that unequal distribution of the bounties of nature, which it has been the object of the philanthropist in all ages to correct. To place the subject in a different point of view, we may endeavour to ascertain what would be the natural increase of population, if left to itself with perfect freedom; and what might be expected to be the rate of increase in the productions of the earth under the most favourable circumstances of human industry. Hitherto, in no state has the population been left to exert itself with perfect freedom. In some of the northern states of America, in which the means of subsistence have been more ample, and the checks to early marriages fewer, than in any of the modern states of Europe, the population has been found to double itself for several successive periods every twenty-five years. In the back settlements this was effected in fifteen years. Sir William Petty supposed it possible that population might be doubled in ten years. Mr. Malthus takes the slowest of these rates of increase, and assumes, that population, when unchecked, goes on doubling itself every twenty-five years, or it increases in a *geometrical* ratio. The rate according to which the productions of the earth may be supposed to increase, is not so easily determined; but when acre has been added to acre, till all the fertile land is occupied, the yearly increase of food must depend upon the melioration of the land already in cultivation, and Mr. Malthus shews most satisfactorily, that, on this supposition, the means of subsistence, under circumstances the most favourable

to human industry, could not possibly be made to increase faster than in an *arithmetical* ratio. He then points out the necessary effects of these two different rates of increase, and observes, that taking the whole earth, by which means emigration is put out of the question, and supposing the present population equal to a thousand millions, the human species would increase as the numbers 1, 2, 4, 8, 16, 32, 64, 128, 256, and subsistence as 1, 2, 3, 4, 5, 6, 7, 8, 9. Hence, in two centuries, the population would be to the means of subsistence as 256 to 9; in three centuries, as 4096 to 13; and in two thousand years the difference would be almost incalculable. Upon this supposition, no limits whatever are placed to the produce of the earth, it may increase for ever, and be greater than any assignable quantity; but the power of population being in every period so much superior, the increase of the human species can only be kept down to the level of the means of subsistence by the constant operation of some powerful check.

From what has been said above, it appears, 1. That man, like all other animals, multiplies in proportion to the means of subsistence which are placed within his reach. 2. That there is a power of increase in the human race, much greater than is generally exercised, always ready to exert itself as soon as it finds an opening, and appearing continually in sudden starts of population, whenever the funds for the maintenance of labour have experienced an increase, in whatever way this may have been occasioned. 3. That this power of increase is so great, and, in its nature, necessarily so different from any increase which can result from adding together different portions of a limited quantity of land, or gradually improving the cultivation of the whole, that the funds for the maintenance of labour cannot, under any system the most favourable to human industry, be made permanently to keep pace with such an increase of population as has been observed to take place for short periods in particular countries; and consequently, as man cannot live without food, that the superior power of population cannot be kept on a level with the funds which are to support it, without the almost constant operation of considerable checks of one kind or other. These checks, according to Mr. Malthus, are all resolvable into moral restraint, vice, and misery.

Dr. Adam Smith, in speaking of the dependence of man, like other animals, on the means of subsistence, and of the impossibility of his increasing beyond them, observes, "But, in civilized society, it is only among the inferior ranks of people, that the scantiness of subsistence can set limits to the farther multiplication of the species; and it can do so in no other way, than by destroying a great part of the children which their fruitful marriages produce." As the poverty and misery which would destroy a considerable portion of children must necessarily be severely felt, not only by the beings thus suffering, but by their parents and survivors, it must be acknowledged, that such premature mortality is a very stern leveller, but fortunately this is not the only method used to effect the purpose. There are other ways by which population may proportion itself to the means of subsistence. Mr. Malthus shews very satisfactorily, that the effects of the difficulty of providing for a family do not appear only in a premature mortality, but also in the delay of engaging in a connection that is likely to be attended with such a consequence, which he ranks under moral restraint. This view of the subject not only accords better with our ideas of a being who possesses reason, but is confirmed by what is taking place in all the countries with which we are acquainted, where it is found, that when the funds for the maintenance of labour become comparatively

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comparatively scanty, the marriages generally become later and less frequent.

It hence appears, that the checks to population may be divided into two general classes, *viz.* those which operate in *preventing the birth* of a population which cannot be supported, and those which *destroy it* after it has been brought into existence; or, as they are denominated by Mr. Malthus, the *preventive* checks, and the *positive* checks. The determination to defer or decline matrimony from a consideration of the inconveniences to which a large portion of the community would subject themselves by pursuing the dictates of nature, Mr. Malthus denominates the *preventive* check: and whatever contributes to shorten the natural duration of human life, as extreme poverty, bad nursing of children, excesses of all kinds, the whole train of common diseases and epidemics, wars, pestilence, plague, and famine, are the *positive* checks to population.

The necessary and constant effect of some checks to population being fully established, and these checks being divisible into the classes above-mentioned, we cannot for a moment hesitate in determining which of them we should wish to see put in operation. It has been noticed, in most countries, that in years of scarcity and dearth, the marriages are fewer than usual; and if, under all the great variations to which the increase of the means of subsistence is necessarily exposed from a variety of causes, the population were proportioned to the actual means of subsistence, more by the prudence of the labouring classes in delaying marriage, than by the misery which produces premature mortality among their children, it cannot be doubted that the happiness of mankind would be decidedly improved. It is equally certain, that under a given increase of the funds for the maintenance of labour, it is impossible to give to each labourer a larger share of these funds, or materially to improve his condition, without some increase of the preventive check; and that all efforts to improve the condition of the poor, which, at the same time, have no tendency to produce a more favourable proportion between the means of subsistence and the population which is to consume them, can only be partial or temporary, and must ultimately defeat their own object. Hence it follows, that in order to improve the condition of the lower classes of society, to make them suffer less under any diminution of the funds for the maintenance of labour, and enjoy more under any actual state of these funds, every attempt should be made to discourage helpless and improvident habits, and to raise them as much as possible to a sense of the dignity of their nature. The causes which chiefly tend to foster helpless, indolent, and improvident habits among the lower classes, are despotism and ignorance, and whatever increases their dependence, and weakens the motives to personal exertion. Whereas the causes which principally tend to promote habits of industry and prudence, are good government, and good education, and whatever has a tendency to increase their independence and respectability. Wherever the registers of a country indicate great mortality, and the general prevalence of the check arising from disease and death over the check arising from prudential habits; there we find the people debased by oppression, and sunk in ignorance and insolence. On the other hand, wherever the registers of a country indicate a small mortality, and the prevalence of the check from prudential habits above that from premature mortality; there we as constantly find security of property established: some degree of intelligence and knowledge, with a certain taste for cleanliness and comforts.

The differences observable in different nations, in the pressure of the evils resulting from the tendency of the human race to increase faster than the means of subsistence, lead to the inference, that those which are in the best state are still susceptible of great improvement; and that the worst may at least be made equal to the best. "This," says a good writer on the subject, "is surely sufficient both to animate and direct our exertions in the cause of human happiness; and the direction which our efforts will receive, from thus turning our attention to the laws that relate to the increase and decrease of mankind, and seeing their effects exemplified in the state of the different nations around us, will not be into any new and suspicious path, but into the plain, beaten track of morality. It will be our duty to exert ourselves to procure the establishment of just and equal laws, which protect and give respectability to the lowest subject, and secure to each member of the community the fruits of his industry; to extend the benefits of education as widely as possible: and, in general, to discourage indolence, improvidence, and a blind indulgence of appetite, without regard to consequences; and to encourage industry, prudence, and the subjection of the passions to the dictates of reason. The only change, if change it can be called, which the study of the laws of population can make in our duties, is, that it will lead us to apply, more steadily than we have hitherto done, the great rules of morality to the case of marriage, and the direction of our charity; but the rules themselves, and the foundations on which they rest, of course remain exactly where they were before."

Mr. Malthus thinks the effect of our poor laws, is to encourage marriage between persons who have no prospect of providing for the presumptive issue of marriage. Thus, he adds, these laws create mouths, but are perfectly incompetent to provide food for them: instead of raising the real price of labour, by increasing the demand for labourers, they tend to overstock the market, to reduce the demand, and diminish the value. They raise the price of provisions by increasing the consumption, and by supplying the parochial pensioners with the means of obtaining them. In consequence of this, the class of industrious labourers who are above soliciting assistance are frequently sunk in the scale of misery, much lower than others who have thrown off all sense of shame, and all honest feelings of independence. Mr. Malthus shews, that in a moral point of view the effects of the poor laws are equally injurious to the best interests of society: he is not, however, for an immediate and abrupt abolition of them: he suggests what will answer the end, *viz.* a gradual abolition of them, by proposing, that no child born from any marriage taking place after the expiration of a year from the date of the law, and no illegitimate child born two years from the same date, should be entitled to parish assistance. This, he thinks, would operate as a fair notice, which no man could mistake, and without pressing hard upon any individual, would at once throw off the rising generation from that wretched dependence upon the government and the wealthy, the consequences of which are almost incalculable.

Although the good intentions of Mr. Malthus are clearly evident in every page of his work, we are not prepared to follow him in all his theories; in endeavouring to avoid one extreme, he has probably fallen into its opposite. The system of Providence, with respect to the increase of the population, does not seem to us liable to such objections as must present themselves to every reflecting person on the careful perusal of the Essay on Population. Besides, admitting

mitting that the parish funds were shut up from the poor—that public benevolence were restrained by a fixed and undeviating law; no act of the legislature could blunt the feelings of individuals—private benevolence would undoubtedly be extended in proportion as public charity was withdrawn.

According to Mr. Malthus's system, the most effectual mode of improving the condition of the poor, is to explain to them clearly and explicitly the true cause of their poverty; to make them feel, that a redundant population is the real source of all their evils; and that they themselves, by early and improvident marriages, are the causes of the calamities which they bewail: to shew them, that the withholding of the supplies of labour is the only possible way of raising its price; and that they themselves, being the possessors of this commodity, have alone the power to do it. This mode of diminishing the evils of poverty would not be found so simple and easy as Mr. Malthus imagines. Political economy is a subject not easily understood but by persons accustomed to patient thought and moral investigation. Those in the lower ranks of society must be better instructed, before they can possibly apprehend and appreciate the maxims Mr. M. would inculcate. Before, therefore, they can be expected to understand the nature and causes of poverty, they must be better educated in all other topics; but education is the *effect* of a meliorated condition in life, and not the cause. Another very forcible objection is, that the system of reform would not benefit the present race of individuals: the advantages proposed are to be felt by posterity, or, at the most, by the rising generation; and other things remaining the same, is it to be expected that the mass of the people would readily sacrifice personal and present pleasures for the sake of promoting general and future good?

Mr. Malthus lays it down as a fundamental maxim, that in any efforts which we may make to improve the condition of the lower classes of society, we must not, on any account, do any thing which tends directly to encourage marriage: he adds, that "the precise reason why I think that more children ought not to be born than the country can support, is, that the greatest possible number of those that are born may be supported. We cannot, in the nature of things, assist the poor, in any way, without enabling them to rear up to manhood a greater number of their children. But this is of all other things the most desirable, both with regard to individuals and the public. Every loss of a child from the consequences of poverty, must evidently be preceded and accompanied by great misery to individuals; and with respect to the public, every child that dies under ten years of age, is a loss to the nation of all that has been expended in its subsistence till that period. Consequently, in every point of view, a decrease of mortality, at all ages, is what we ought to aim at. We cannot, however, effect this object, without first crowding the population, in some degree, by making more children grow up to manhood; but we shall do no harm, in this respect, if, at the same time, we can impress these children with the idea that to possess the same advantages as their parents, they must defer marriage till they have a fair prospect of being able to maintain a family. If we cannot do this, all our former efforts will have been thrown away. It is not in the nature of things, that any permanent and general improvement in the condition of the poor can be effected without an increase in the preventive check; and unless that take place, either with or without our efforts, every thing that is done for the poor must be temporary and partial; a diminution

of mortality, at present, will be balanced by an increase of mortality in future; and the improvement of their condition in one place, will proportionally depress it in another. This is a truth so important, and so little understood, that it can scarcely be too often insisted upon. The generality of charitable people, and of the encouragers of marriage, are not in the smallest degree aware of the real effects of what they do." The practice of mankind, on the subject of marriage, our author admits, has been much superior to their theories, and however frequent the exhortations may have been to enforce the duty of early unions, each individual has practically found it convenient, not to say necessary, to consider the means of supporting a family before he ventured to take so important a step. The desire of bettering our condition, and the fear of making it worse, have been constantly directing people into the right road, in spite of all declamations which tended to lead them aside. Owing to this powerful spring of health in every state, the prudential check to marriage has increased in Europe, and upon the increasing operation of this principle, much of the future melioration of the state of society probably depends.

Such is the substance of Mr. Malthus's work. He maintains, that his theory and conclusions are not only undeniable, but rest on facts that are obvious to every observer. They are, however, rejected by a large class of respectable and well-meaning people, because they say, that the acknowledgment of a law of increase in the human race, greater than any possible increase of the means of subsistence, is an impeachment of the power, or the benevolence of the Deity. "The religious mind," says one of his opponents, "revolts at the apparent want of intelligence and contrivance in the author of the creation, in infusing a principle into the nature of man, which it required the utmost exertion of human prudence and ingenuity to counteract." To which it has been replied, that we are not permitted to reject truths, of which our senses and experience give us the firmest assurance, because they do not accord with our preconceived notions respecting the attributes of the Deity. All our evidence for the prevailing benevolence of the works of creation—all our evidence of the power of the Creator—is derived from these sources. This evidence we must not and cannot refuse to hear, and it is an after concern, to reconcile the undeniable state of the fact to the attributes which we assign to the divinity. Besides, this world is unquestionably a state of discipline and preparation for another; and it may be affirmed, that in the whole compass of the laws of nature, not one can be pointed out, which, in so peculiar and marked a manner, accords with this view of the state of man on earth. The purpose of the earthquake, the hurricane, the drought, or the famine, by which thousands, and sometimes almost millions of the human race are at once overwhelmed, or left the victims to lingering want, is certainly inscrutable. Events of this kind are, however, of obvious and acknowledged recurrence, and on this principle we should find little or no difficulty in believing, that a law of nature exists peculiarly calculated to rouse the faculties, and direct the exertions of the human race, which, by its varying pressure, and the difficulties to which it gives rise, exercises and enlarges the powers of the mind, and calls into action all the great moral virtues which dignify and adorn human nature, as necessary to human happiness; which, above all, is constantly inculcating the necessity of the subjection of the passions to the dictates of reason and religion, and which, even if vice and misery were well nigh banished from the earth by the efforts of virtue, would occasion the necessity

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necessity of constant watchfulness and attention to maintain and secure the happiness which has been obtained.

It has been urged, that checks to population will occasion a dearth of soldiers for the army, and of hands to our manufactures; but the power of a country, as well in war as in commerce, must depend upon that part of its population which is active and efficient, not upon the helpless and inefficient. If, for instance, it has been found by experience, that one country which has 100,000 births in a year, does not rear so many to manhood as another country which has only 80,000, the latter is unquestionably the stronger of the two. If, in addition to the question of numerical force, we take into consideration the state of misery and depression in the first country, which must have occasioned the premature mortality, we cannot doubt that the second would be indefinitely superior in industry and energy, as well as in the happiness of its inhabitants. "Not only would a country where the checks to population arise from the prudential habits of the lower class, rather than from premature mortality, possess a greater military and manufacturing population, with the same means of subsistence, but from the very circumstance of the country's containing this larger proportion of persons in the active periods of life, the means of subsistence would stand a much fairer chance of being increased with rapidity. This is, in fact, confirmed by experience; England, Scotland, Switzerland, and Norway, where the premature checks to population are observed to prevail with the greatest force, increase faster in the funds for the maintenance of labour, and, of course, in the population supported by them, than most of the countries of Europe that have a larger proportion of births."

The progress of the population of the world, and its present total amount, cannot be ascertained with much precision, as there are no sufficient grounds on which such a computation can be formed. Sir W. Petty, in 1682, stated the population of the world at only 320 millions. Other writers have estimated it much higher; some, indeed, have gone so far as to suppose there were at least 1000 millions

of inhabitants on the earth: and the late Mr. J. J. Grellier says, a strong presumption that the inhabitants of the earth at present (1801) exceed considerably a thousand millions, arises from the circumstance, that, in almost every country where the people have been numbered, or sufficient data obtained for computing their number, it has been found considerably greater than it had been previously supposed. In Great Britain, for instance, the most correct estimates previously to 1801, did not make the population exceed seven or eight millions, whereas by the enumeration in that year it appeared to amount to nearly eleven millions, and, as will be seen hereafter, in 1811, to more than twelve millions and a half. The population of France was estimated by M. Sufmilch at sixteen millions, others supposed it to be eighteen, twenty; and twenty-four millions; but at the commencement of the revolution in 1789, it appeared, from the returns of the births and burials, to contain thirty millions of inhabitants. Spain, which with Portugal had been estimated at only six millions, or at most eight millions, was found in 1787, by actual enumeration, to contain alone ten millions and a half. Russia, about 1765, was supposed to contain only fifteen millions of inhabitants; but according to the calculation given by Mr. Coxe, grounded upon the result of a poll-tax, they amounted to 26,766,360; and including the provinces not subject to the poll-tax, the calculation for the year 1796, amounted to thirty-six millions of inhabitants. It is true a great part of this empire is in Asia, still the author to whom we have alluded, has no hesitation in concluding, that the population of Europe, usually taken at one hundred millions, is considerably greater than this. Mr. Grellier stated the number, as he believed, below the truth, in 1801, at 130,000,000. In 1812, the numbers were given according to the following statement; but in both cases the results can be only approximations to the truth.

The following table, containing the number of inhabitants in each European country, and also the population of its chief cities, will afford a comparative view of the present population of the European states, and of their respective capitals.

Countries.	Population.	Capitals.	Population.
British Dominions, including } Ireland - - - }	15,396,650	London - - -	1,050,000
Denmark and Norway - -	2,750,000	Copenhagen - - -	90,000
Sweden - - -	2,000,000	Stockholm - - -	75,000
Russia - - -	36,000,000	St. Peterburgh - - -	180,000
Austria - - -	20,000,000	Vienna - - -	224,550
Prussia - - -	5,200,000	Berlin - - -	150,000
Germany - - -	24,000,000	Frankfort on the Mayne - - -	40,000
Holland - - -	2,220,000	Amsterdam - - -	212,000
France, including the Ne- } therlands - - - }	36,345,000	Paris - - -	547,756
Spain - - -	10,351,000	Madrid - - -	147,540
Portugal - - -	2,550,000	Lisbon - - -	200,000
Switzerland - - -	1,800,000	Berne - - -	13,000
Italy - - -	12,000,000	Rome - - -	180,000
Turkey - - -	8,500,000	Constantinople - - -	400,000
Total	179,112,650	Total	3,509,846

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The population of Great Britain was very long a subject of great uncertainty, both with respect to the actual number of inhabitants, and their increase or diminution; it became the subject of frequent controversy among writers on the internal policy and strength of the country, till it was at length, in a measure, set at rest by an act of parliament, passed on the 31st of December 1800, which directed a general enumeration of houses and families, and persons, to be made on the tenth of the following March, and in Scotland, on account of the coldness of the climate, as soon as possible after that day. The result was as follows.

Summary of the Enumeration for 1801.

	No. of Inhabited Houses.	By how many Families inhabited.	Uninhabited Houses.
England	1,472,870	1,787,520	53,965
Wales	108,053	118,303	3,511
Scotland	294,553	364,079	9,537
Totals	1,875,476	2,269,902	67,013

	No. of Males.	No. of Females.	Total.
England	3,987,935	4,343,499	8,331,434
Wales	257,178	284,368	541,546
Scotland	734,581	864,487	1,599,068
Army including militia	198,351	—	198,351
Navy and marines	126,279	—	126,279
Seamen in regt. ship-ping	144,558	—	144,558
Convicts on board the hulks	1,410	—	1,410
Totals	5,450,292	5,492,354	10,942,646

The islands of Guernsey, Jersey, Alderney, and Sark; the Scilly islands, and the Isle of Man, were not included in this enumeration: the total population of these islands has been usually reckoned at about 80,000. The number of houses in Ireland has been nearly ascertained by the collection of a hearth money tax, from whence it has been computed, that the population of that island exceeds four millions of persons; therefore, with a moderate allowance for those places from which no returns were received, and for some omissions in others, the total population of the united kingdom of Great Britain and Ireland, amounted, in 1801, to more than fifteen millions. At the commencement of the preceding century, Dr. Davenant published an account of the number of houses in England and Wales, taken in the year 1690, and a comparison of them shews an increase

from 1690 to 1801 of 261,708 houses, which makes an increase of the population equal to nearly a million and a half of people. There must, however, have been a greater increase than this, as the number of soldiers and seamen in 1801, certainly exceeded by much those employed in 1690. The circumstance that caused considerable disagreement in the estimates, which, previously to the enumeration, had been formed on this subject, was the want of sufficient accounts to determine the proportion of persons to a house. Dr. Davenant and Dr. Brakenbridge reckoned six persons to a house, whereas Mr. G. King allowed but little more than $4\frac{1}{2}$ in London, and $4\frac{3}{10}$ in the other cities and market towns, and four in the villages. Dr. Price asserted, that six persons to a house for London, and five to a house for all England, was no doubt too large an allowance, but it was found in 1801, that in England and Wales the proportion was $5\frac{3}{5}$ persons to a house, and in Scotland $5\frac{2}{5}$. The proportion of inhabitants to a house differs very considerably in some counties of England: the principal cause of this difference is the large towns, and particularly the sea-ports which some of them contain, as in such places the inhabitants live more crowded together than in moderate sized inland towns; thus in the enumeration of 1801, the following results were given.

Inhabitants.	Towns.	No. of Persons in a House.
864,845	London	$7\frac{1}{4}$
84,020	Manchester	$6\frac{3}{4}$
77,653	Liverpool	$6\frac{3}{4}$
63,645	Bristol	6
43,194	Plymouth	$9\frac{1}{4}$
32,200	Bath	$7\frac{1}{2}$
32,166	Portsmouth	6
29,516	Hull	$6\frac{1}{4}$
28,366	Newcastle	9

A remarkable difference will be seen between those and the following, which are manufacturing towns; the trade of which had, for several years, previously to the census, been in a declining state.

Inhabitants.	Towns.	No. of Persons in a House.
73,670	Birmingham	5
53,162	Leeds	$4\frac{3}{4}$
36,832	Norwich	$4\frac{1}{2}$
31,314	Sheffield	$4\frac{3}{4}$
28,861	Nottingham	$5\frac{3}{4}$

In these the population is unquestionably much below the usual standard; but a few years of peace will probably restore the inhabitants which they had lost, and reduce, in some degree, the population of the principal out-ports. The following table, taken from Thomson's Journal, will, it is presumed, be deemed an important addition to the present article.

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TABLE of the Population of Great Britain, according to the Returns made to Parliament in 1811, compared with the Population in the Years 1700, 1750, and 1801.

ENGLAND.

Counties of	Population.				Area in Square Miles.	Annual Proportions.		
	In 1700.	In 1750.	In 1801.	In 1811.		One Baptism to	One Burial to	One Marriage to
						Persons.		
Bedford - - - -	48,500	53,900	65,500	72,600	430	32	56	126
Berks - - - -	74,700	92,700	112,800	122,300	744	34	53	144
Buckingham - - -	80,500	90,700	111,000	121,600	748	33	49	129
Cambridge - - -	76,000	72,000	92,300	104,500	686	30	44	127
Chester - - - -	107,000	131,600	198,100	234,600	1,017	33	50	131
Cornwall - - - -	105,800	135,000	194,500	223,900	1,407	32	62	141
Cumberland - - -	62,300	86,900	121,100	138,300	1,497	35	54	138
Derby - - - -	93,800	109,500	166,500	191,700	1,077	33	56	137
Devon - - - -	248,200	272,200	354,400	396,100	2,488	33	58	113
Dorset - - - -	90,000	96,400	119,100	128,900	1,129	35	57	135
Durham - - - -	95,500	135,000	165,700	183,600	1,040	33	50	128
Essex - - - -	159,200	167,800	234,000	260,900	1,525	33	44	128
Gloucester - - -	155,200	207,800	259,100	295,100	1,422	36	61	120
Hereford - - - -	60,900	74,100	92,100	97,300	974	36	58	150
Hertford - - - -	70,500	86,500	100,800	115,400	604	34	55	163
Huntingdon - - -	34,700	32,500	38,800	43,700	345	31	48	129
Kent - - - -	153,800	190,000	317,800	385,600	1,462	30	41	118
Lancaster - - - -	166,200	297,400	695,100	856,000	1,806	29	48	108
Leicester - - - -	80,000	95,000	134,400	155,100	816	36	57	130
Lincoln - - - -	180,000	160,200	215,500	245,900	2,787	32	51	126
Middlesex - - - -	624,200	641,500	845,400	985,100	295	40	36	94
Monmouth - - - -	39,700	40,600	47,100	64,200	516	47	64	153
Norfolk - - - -	210,200	215,100	282,400	301,800	2,013	30	50	128
Northampton - -	119,500	123,300	136,100	146,100	965	35	52	133
Northumberland -	118,000	141,700	162,300	177,900	1,809	37	53	137
Nottingham - - -	65,200	77,600	145,000	168,400	774	32	52	119
Oxford - - - -	79,000	92,400	113,200	123,200	742	34	55	138
Rutland - - - -	16,600	13,800	16,900	17,000	200	32	53	147
Salop (Shropshire) -	101,600	130,300	172,200	200,800	1,403	36	57	143
Somerfet - - - -	195,900	224,500	282,800	313,300	1,549	35	52	129
Southampton (Hampshire) -	118,700	137,500	226,900	253,300	1,533	31	49	106
Stafford - - - -	117,200	160,000	247,100	304,000	1,196	32	52	121
Suffolk - - - -	152,700	156,800	217,400	242,900	1,566	31	53	128
Surrey - - - -	154,900	207,100	278,000	334,700	811	36	45	130
Suffex - - - -	91,400	107,400	164,600	196,500	1,461	30	55	129
Warwick - - - -	96,600	140,000	215,100	236,400	984	35	42	116
Westmoreland - -	28,600	36,300	43,000	47,500	722	31	54	135
Wilts - - - -	153,900	168,400	191,200	200,300	1,283	35	54	136
Worcester - - - -	88,200	108,000	143,900	165,900	674	32	52	132
York, East Riding - -	96,200	85,500	144,000	173,000	1,268	30	47	115
Do. North Riding - -	98,600	117,200	160,500	157,600	2,112	30	51	125
Do. West Riding - -	236,700	361,500	582,700	675,100	2,633	31	51	123
Totals - - - -	5,108,500	6,017,700	8,609,000	9,855,400	50,210	33	49	120

POPULATION.

WALES.

Counties of	Population.				Area in Square Miles.	Annual Proportions.		
	In 1700.	In 1750.	In 1801.	In 1811.		One Baptism to	One Burial to	One Marriage to
Anglesey - - - -	22,800	26,900	35,000	38,300	402	38	72	139
Brecon - - - -	27,200	29,400	32,700	39,000	731	38	54	129
Cardigan - - - -	25,300	32,000	44,100	52,000	726	41	73	141
Carmarthen - - - -	49,700	62,000	69,600	79,800	926	42	62	131
Carnarvon - - - -	24,800	36,200	43,000	51,000	775	35	67	137
Denbigh - - - -	39,700	46,900	62,400	66,400	731	33	52	140
Flint - - - -	19,500	29,700	41,000	48,100	309	31	53	154
Glamorgan - - - -	49,700	55,200	74,000	88,000	822	37	53	121
Merioneth - - - -	23,800	30,900	30,500	32,000	691	40	62	129
Montgomery - - - -	27,400	37,000	49,300	53,700	982	36	63	152
Pembroke - - - -	41,300	44,800	58,200	62,700	575	48	64	135
Radnor - - - -	15,300	19,200	19,700	21,600	455	36	56	144
Totals - - - -	366,500	449,300	559,000	632,600	8,125	37	60	122

SCOTLAND.

Counties of	Population.				Area in Square Miles.
	In 1700.	In 1750.	In 1801.	In 1811.	
Aberdeen - - - -	—	—	—	135,075	
Argyll - - - -	—	—	—	85,585	
Ayr - - - -	—	—	—	103,954	
Banff - - - -	—	—	—	36,668	
Berwick - - - -	—	—	—	30,779	
Bute - - - -	—	—	—	12,033	
Caithness - - - -	—	—	—	23,419	
Clackmannan - - - -	—	—	—	12,010	
Dumbarton - - - -	—	—	—	24,189	
Dumfries - - - -	—	—	—	62,960	
Edinburgh - - - -	—	—	—	148,607	
Elgin - - - -	—	—	—	28,108	
Fife - - - -	—	—	—	101,272	
Forfar - - - -	—	—	—	107,264	
Haddington - - - -	—	—	—	31,164	
Inverness - - - -	—	—	—	78,336	
Kincardine - - - -	—	—	—	27,439	
Kinrofs - - - -	—	—	—	7,245	
Kirkcubright - - - -	—	—	—	33,684	
Lanark - - - -	—	—	—	191,752	
Linlithgow - - - -	—	—	—	19,451	
Nairn - - - -	—	—	—	8,251	
Orkney, and } - - - -	—	—	—	23,238	
Shetland } - - - -	—	—	—	22,915	
Peebles - - - -	—	—	—	9,935	
Perth - - - -	—	—	—	135,093	
Renfrew - - - -	—	—	—	92,596	
Rofs and Cromartie - - - -	—	—	—	60,853	
Roxburgh - - - -	—	—	—	37,230	
Selkirk - - - -	—	—	—	5,889	
Stirling - - - -	—	—	—	58,174	
Sutherland - - - -	—	—	—	23,629	
Wigtown - - - -	—	—	—	26,891	
Totals - - - -	1,048,000	1,403,000	1,652,100	1,805,688	29,167
Ditto, allowing proportion in } army and navy - - - -	—	—	—	1,865,000	

POPULATION.
GRAND TOTALS.

	Population.				Area in Square Miles.
	In 1700.	In 1750.	In 1801.	In 1811.	
England - - - -	5,108,500	6,017,700	8,609,000	9,855,400	50,210
Wales - - - -	366,500	449,300	559,000	632,600	8,125
Scotland - - - -	1,048,000	1,403,000	1,652,100	1,865,000	29,167
	6,523,000	7,860,000	10,820,100	12,353,000	87,502

Second Summary, taking the Army and Navy separately.

ENGLAND	{ Males - - - -	4,575,763	MALES in England - - - -	4,575,763
	{ Females - - - -	4,963,064	Wales - - - -	291,633
WALES	{ Males - - - -	291,633	Scotland - - - -	826,191
	{ Females - - - -	320,155	Army and navy, &c. - - - -	640,500
SCOTLAND	{ Males - - - -	826,191	Total - - - -	6,334,087
	{ Females - - - -	979,497		
Army, Navy, Marines, and Seamen, in registered vessels	{ - - - -	640,500	FEMALES in England - - - -	4,963,064
			Wales - - - -	320,155
			Scotland - - - -	979,497
Grand total - - - -	- - - -	12,596,803	Total - - - -	6,262,716

	Houses.				Occupations.		
	Inhabited.	By how many Families occupied.	Building.	Uninhabited.	Families chiefly employed in Agriculture.	Do. chiefly employed in Trade, Manufactures, and Handicrafts.	Do. not comprehended in the two preceding Classes.
England - - - -	1,678,106	2,012,391	15,188	47,925	697,353	923,588	391,450
Wales - - - -	119,398	129,756	1,019	3,095	72,846	36,044	20,866
Scotland - - - -	304,093	402,068	2,341	11,329	125,799	169,417	106,852
Totals - - - -	2,101,597	2,544,215	18,548	62,349	895,998	1,129,049	519,168

FAMILIES in England - - - -	2,012,391
Scotland - - - -	402,068
Wales - - - -	129,756
	<u>2,544,215</u>

This gives us rather more than $4\frac{1}{2}$ persons to each family.

An attempt was made to ascertain the population of France in the tenth year of the republic; but the account was not deemed very accurate. The whole population of the 102 departments, into which France was then divided, was stated at 33,104,343 persons, on an extent of about 185,600 square miles. The account included thirteen departments incorporated with the north of France, four departments in the south, and some smaller acquisitions, comprehending 23,790 square miles, containing 5,114,419 inhabitants.

According to tables published in 1811, in the Almanac of the French Board of Longitude, the population of the French empire, as it was then denominated, amounted to 43,937,144 persons. Of this number it was supposed that 28 millions spoke the French language; 6,453,000 the Italian; 4,063,000 the Dutch or Flemish; 967,000 the Breton; and 108,000 the Basque.

The population of the states connected with the system of France, in which number were included the kingdoms of Italy, Switzerland, Spain, the Confederation of the Rhine, &c. was estimated at more than 38 millions.

In the returns to parliament in 1811, we have an account of the population of the principal towns in Great Britain. We shall set down all those which contain 20,000 inhabitants, and upwards. Of these there are 17 in England, and five in Scotland: whereas in France, according to a census taken in the same year, there were 49 such towns; as will be seen below:

ENGLAND.

1. London - - - -	1,050,000
2. Manchester - - - -	98,573
3. Liverpool - - - -	94,376
4. Birmingham - - - -	85,753
5. Bristol - - - -	76,433
6. Leeds - - - -	62,534
7. Plymouth - - - -	56,060
8. Portsmouth, Portsea, and Gosport - - - -	48,355
9. Norwich - - - -	37,256
10. Deptford and Greenwich - - - -	36,780
11. Sheffield - - - -	35,840
12. Nottingham - - - -	34,253

13. Bath	- - - - -	31,496
14. Newcastle-upon-Tyne	- - - - -	27,587
15. Kingston-upon-Hull	- - - - -	26,792
16. Leicester	- - - - -	23,146
17. Chatham and Rochester	- - - - -	21,722

SCOTLAND.

1. Edinburgh	- - - - -	102,987
2. Glasgow	- - - - -	100,749
3. Paisley	- - - - -	36,722
4. Dundee	- - - - -	29,616
5. Aberdeen	- - - - -	21,639

FRANCE.

Paris	- - - 547,756	Alessandria	- - - 30,000
Marseilles	- - - 96,413	Besançon	- - - 28,436
Bordeaux	- - - 90,992	Nancy	- - - 28,227
Lyons	- - - 88,919	Verfailles	- - - 27,574
Rouen	- - - 87,000	Rennes	- - - 25,904
Turin	- - - 79,000	Brest	- - - 25,865
Nantes	- - - 77,162	Louvain	- - - 25,000
Brussels*	- - - 66,297	Aix-la-Chapelle	- - - 24,419
Anvers	- - - 56,818	Troyes	- - - 24,051
Gand	- - - 55,161	Geneve	- - - 22,759
Lille	- - - 54,756	Mayence	- - - 22,325
Toulouse	- - - 50,171	Touci	- - - 21,974
Liege	- - - 50,000	Montauban	- - - 21,950
Straßbourg	- - - 49,056	Mondovi	- - - 21,557
Cologne	- - - 42,706	Avignon	- - - 21,412
Orleans	- - - 41,937	Tournay	- - - 21,303
Amiens	- - - 41,279	Asti	- - - 21,225
Nismes	- - - 39,594	Dunkirk	- - - 21,158
Metz	- - - 38,656	Aix	- - - 21,009
Bruges	- - - 33,633	Grenoble	- - - 20,654
Angers	- - - 33,000	Tours	- - - 20,240
Montpellier	- - - 32,723	Limoges	- - - 20,225
Caen	- - - 30,923	Saint Omer	- - - 20,109
Rheims	- - - 30,225	Dieppe	- - - 20,000
Clermont	- - - 30,000		

* This and several others now (April 1814) are no part of the kingdom of France.

Malthus on Population. Monthly Magazine. Imperial Review, vol. i. Edinburgh Review, vol. xvi. Thomson's Journal, vol. i.

POPULEUM, or POPULNEUM, in *Pharmacy*, an unguent prepared of the buds of black poplar, violet leaves, navel-wort, and lard, bruised and macerated; to which are added bramble-tops, leaves of black poppies, mandragora, henbane, nightshade, lettuce, and burdock, boiled in rose-water, and strained. It was formerly much used as a cooler in burns, scalds, all sorts of inflammations, and also to allay arthritic pains, but it is now almost entirely disregarded.

POPULICANI. See POPLICANI.

POPULO, in *Geography*, a town of New Navarre; 200 miles S. of Casa Grande.

POPULONIUM, or POPULONIA, in *Ancient Geography*, a town of Italy, upon a promontory of the same name, founded by a colony, conducted from Volterra to this place by king Propertius.

POPULUS, in *Botany*, the Poplar tree, an old Latin name, concerning whose derivation we find nothing conclusive. Possibly the verb *παλλω*, or *πιπαλλω*, may have been its basis.—Linn. Gen. 526. Schreb. 693. Willd. Sp. Pl. v. 4. 802. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 1079. Ait. Hort. Kew. v. 5. 394. Pursh 618. Juss. 409. Tourn. t. 365. Lamarck Illustr. t. 819. Gærtn. t. 90.—Class and

order, *Dioecia Polyandria*. Nat. Ord. *Amentaceæ*, Linn. Juss.

Gen. Ch. Male, *Cal.* Common catkin oblong, loosely imbricated, cylindrical, composed of oblong, single-flowered, flat scales, torn at the margin. *Cor.* Petals none. Nectary of one leaf, turbinate and tubular at the base, terminating upwards in an ovate oblique border. *Stam.* Filaments eight, rarely 16 or 20, short; anthers short, quadrangular, large.

Female, on a separate plant, *Cal.* and *Cor.* as in the male. *Pist.* Germen ovate, pointed, superior; style scarcely any; stigma in four, rarely eight, oblong segments. *Peric.* Capsule ovate, of two cells and two valves, which are at length reflexed. *Seeds* numerous, ovate, winged with capillary down.

Ess. Ch. Male, Calyx the scales of a catkin; torn. Nectary turbinate, oblique, entire. Stamens eight or more.

Female, Calyx and Corolla like the male. Stigmas four or eight. Capsule superior, with two cells and two valves. Seeds winged with down.

Of this important genus five species only are given by Linnæus in his *Species Plantarum*; Willdenow has thirteen. Four are natives of Britain. All Willdenow's species are mentioned in the new edition of Hort. Kew. as cultivated in Britain; and indeed were adopted by him from the former edition of that work, in which the exotic ones were first determined. They are all lofty trees, of quick growth and ample shade; their wood, though not of prime value for hardness or solidity, is valuable for many purposes. The parts of fructification afford clearer specific distinctions in our English Poplars, than any given previous to the publication of *Fl. Brit.*, but the exotic ones have not, as yet, been sufficiently examined in this particular.

P. alba. Great White Poplar, or Abele tree. Linn. Sp. Pl. 1463. Willd. n. 1. Ait. n. 1. Engl. Bot. t. 1618. Matth. Valgr. v. 1. 123. Camer. Epit. 65.—Leaves roundish, somewhat heart-shaped, lobed, and toothed; downy and very white beneath. Female catkins ovate. Stigmas four.—Native of rather moist woods and hedges, or mountainous thickets, in most parts of Europe, flowering in March. The leaves are fully expanded in May or June. *Root* creeping, throwing up copious young plants. *Tree* large, with a smooth bark, and horizontal branches. *Leaves* alternate, on longish downy stalks; their upper side dark-green, smooth and veiny; the under snow-white with dense soft cottony down. On young luxuriant branches the *leaves* are most deeply lobed, and almost palmate. *Stipulas* on such branches linear-lanceolate, toothed. *Male catkins* long, hairy. *Anthers* violet, eight, twelve, or twenty to each flower. *Female catkins* ovate, but an inch in length, with rather smaller scales. *Stigmas* four, linear, all equally spreading, pale yellowish-green. The wood is white, soft, but tough and close-grained.

P. canescens. Common White, or Grey, Poplar. Fl. Brit. n. 2. Engl. Bot. t. 1619. Willd. n. 2. Ait. n. 2.—Leaves roundish, deeply waved, toothed; grey and downy beneath. Female catkins cylindrical. Stigmas eight.—Native of wet ground in England, France, and Germany; sometimes also found on open elevated spots, where the soil is loamy. This is a taller and more handsome tree than the foregoing, with a beautiful fatty bark. The wood is firmer, being of slower growth, and makes good floors, having the valuable property of not catching fire like deal. The *leaves* are much less white, and less deeply cut or lobed than the *alba*: and the longer female *catkins*, with eight *stigmas* to each flower, afford a decisive specific character.

P. tremula.

P. tremula. Aspen, or Trembling Poplar. Linn. Sp. Pl. 1464. Willd. n. 4. Ait. n. 4. Engl. Bot. t. 1909. (*P. Lybica*; Ger. Em. 1487. Matth. Valgr. v. 1. 125. Camer. Epit. 67.)—Leaves nearly orbicular, toothed, smooth on both sides. Footstalks compressed. Young branches hairy. Stigmas four, auricled at the base.—Native of rather moist woods, as well as of various other situations, throughout Europe, flowering in March. The young suckers are hairy, but no part of the tree is hoary. The long compressed footstalks cause the leaves to tremble with every breath of wind. Catkins two inches long, very hairy. Stamens eight. Stigmas four, erect, crimson, with a pair of reflexed auricles at the base.—The wood is white, soft, light, of a fine grain. Beavers are said by Linnæus to be very fond of the bark.

P. nigra. Black Poplar. Linn. Sp. Pl. 1464. Willd. n. 7. Ait. n. 7. Engl. Bot. t. 1910. Ger. Em. 1486. Matth. Valgr. v. 1. 124.—Leaves deltoid, pointed, serrated, smooth on both sides. Catkins cylindrical, lax. Stigmas four. Common in low woods about the rivers of Europe, flowering in March, but it will, like the rest, grow on a dry gravelly soil. This species throws up no suckers. The tree is large and spreading, with a tough close-grained wood. Footstalks but half the length of the smooth deep-green serrated leaves. Catkins long, lax, and hairy. Stamens usually eight; Leers says sixteen. Stigmas four, awl-shaped, without any appendage.

Such are our native species.

P. dilatata, Willd. n. 8. Ait. n. 8, is the Lombardy, or Po, Poplar, so commonly cultivated, and now so abundant in England, though the first plant was brought from Italy, by lord Rochford, in his travelling carriage, hardly fifty years ago. The leaves of this are very near the *nigra*, but the upright growth of the tree, at least till it attains a considerable height and age, gives it a very different aspect. The fructification requires examination. There is of course but one sex in England, but this, if we recollect right, is fortunately the female, where a specific difference is most to be expected.

P. monilifera, Willd. n. 9. Ait. n. 9. Canadian, or Berry-bearing, Poplar, is a very hardy tree in this country, valuable for planting in exposed situations on a poor sandy soil; but the down of the seeds is a great nuisance near houses, as it sticks to clothes and furniture in a most troublesome manner. Hence the male trees should be selected for planting.

P. balsamifera, Linn. Sp. Pl. 1464, Tacamahac tree, figured in Pallas's Fl. Ross. v. 1. t. 41, is planted in gardens, chiefly for the balsamic fragrance of its buds and young leaves.

POPULUS, in Gardening, contains plants of the hardy deciduous kind, of which the species cultivated are, the white poplar (*P. alba*); the trembling poplar tree, or aspen (*P. tremula*); the black poplar tree (*P. nigra*); the Lombardy or Po poplar tree (*P. dilatata*); the common Tacamahaca poplar tree (*P. balsamifera*); the heart-leaved Tacamahaca poplar tree (*P. candicans*); the smooth poplar tree (*P. lævigata*); the Canadian poplar tree (*P. monilifera*); the Athenian poplar tree (*P. græca*); the various-leaved poplar tree (*P. heterophylla*); and the Carolina poplar tree *P. angulata*.

Of the first sort there are two varieties; the common white poplar, and the great white poplar, or Abele. In the first, the leaves are rounder, and not much above half the size of those of the latter; and the shoots of the latter are paler, the catkins are larger, and the down of the seeds whiter and longer.

In the latter the leaves are large, and divided into three, four, or five lobes, which are indented on their edges; they are of a very dark colour on their upper side, and very white and downy on their under, standing upon footstalks, which are about an inch long: the young branches have a purple bark, and are covered with a white down, but the bark of the stem and older branches is grey. In the beginning of April the male flowers or catkins appear, which are cylindrical, scaly, and three inches long, and about a week after come out the female flowers on catkins, which have no stamina like those of the male. Soon after these come out, the male catkins fall off, and in five or six weeks after, the female flowers will have ripe seeds inclosed in a hairy covering, when the catkins will drop, and the seeds be wafted by the winds to a great distance. According to Mortimer, the best sort comes from Holland and Flanders. Hence in some places it is called Dutch beech.

The fourth sort has been esteemed by some as no more than a variety; and indeed it can scarcely be considered as a distinct species. It has been stated in Mr. Young's Annals, that the Italian poplar is fit to cut for building uses in twelve years, and that at eight years' growth they are forty feet high. For rafters, small beams, studs, boards, &c. it is very durable.

The peculiar use of it in this country has hitherto been for ornamental plantations, and covering unsightly buildings. To the latter purpose its upright close conical mode of growing, with its feathering very readily down to the very ground, particularly adapts it. The conic form of it, as a deciduous tree, is peculiar. Among evergreens we find the same character in the cypress; and both trees in many situations have a good effect. One beauty the Italian poplar possesses which is almost peculiar to it; and that is the waving line it forms when agitated by wind. Most trees in this circumstance are partially agitated; one side is at rest, while the other is in motion; but the Italian poplar waves in one simple sweep from the top to the bottom, like an ostrich-feather on a lady's head. All the branches coincide in the motion; and the least blast makes an impression upon it, when other trees are at rest. Although this tree sometimes has a good effect, when standing single, it generally has a better when two or three are planted in a clump.

Of the fifth sort there are varieties, with much wider leaves; the Daurian, with a longer ovate leaf, more like this sort; and an Altaic variety, with a lanceolate leaf. In Siberia the trunk is straightish, not tall, covered with an ash-coloured bark; the wood reddish, closer, and a little harder than in the common poplars. The branchlets in the Altaic tree are more slender, and rod-like; in the Daurian thick, short, knobbed, and wrinkled, with a yellow skin sometimes of a very deep colour; the leaves in the rod-like variety ovate-acuminate, in the Altaic commonly lanceolate; in the common Daurian ovate and thicker, so as to be in a manner coriaceous; in both very sharp, serrate, quite smooth, shining as if varnished, deep green above, pale underneath; aments terminating, thick, the female ones ripening in June; containing ovate thick rugged capsules, subcylindric with the receptacle, scarcely peduncled.

Method of Culture.—All the sorts are readily increased by cuttings, layers, and suckers.

The planting of the cuttings is the most expeditious mode of raising all these trees, as they grow freely without any trouble, when made either from the young year-old shoots, a foot and a half in length, and planted a foot in depth, or large truncheons of two, three, or more years growth, from about a yard to five or six feet long, planted in moist places: though

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which is the whitest, and whose stains are the greenest, being always chosen for this purpose. The manner of preparing the oil is thus: the petunses, being washed, undergo the same preparations as for making the squares; excepting that the matter of the second urn is not put in moulds, but the finest part of it taken to compose the oil. To a hundred pounds of this matter they cast a mineral stone, called *shekau*, or *kekao*, resembling our alum; this stone is first heated red-hot, and thus reduced in a mortar into an impalpable powder; and serves to give the oil a consistence; which, however, is still to be kept liquid.

The oil of lime makes the fourth ingredient; the preparation of which is much more tedious and circumstantial. They first dissolve large pieces of quick-lime, and reduce it to a powder, by sprinkling water on it; on this powder they lay a couch of dry fern, and on the fern another of the flaked lime, and thus alternately, till they have got a moderate pile; which done, they set fire to the fern; the whole being consumed, they divide the ashes that remain on new couches of dry fern; setting them on fire as before. And this they repeat five or six times successively, or even more; the oil being still the better, as the ashes are oftener burnt.

In the annals of Feou-learn it is said, that instead of fern they anciently used the wood of a kind of medlar-tree; and that it was this gave the ancient porcelains that admirable hue, which the moderns cannot come up to for want of that wood. But this is become scarce in the country, and is no longer used. It is certain, however, the quality of the fern and lime contribute very much to the goodness of the oil.

A quantity of these ashes of fern and lime is now thrown into an urn full of water; and to a hundred pounds of ashes is added a pound of *shekau*, which dissolves therein. The rest being performed after the same manner as in preparing the earth of the petunses, the sediment found at the bottom of the second urn, and which is to be kept liquid, is what they call the *oil of lime*; which the Chinese esteem as the soul of the former oil, and which gives the porcelain all its lustre.

This oil is easily sophisticated by adding water to increase the quantity; adding, at the same time, proportionably of the same *shekau* to maintain the consistence. Ten measures of oil of petunse usually go to one of lime. To have the mixture just, the two oils should be equally thick.

PORCELAIN Vessels, forming of. The first thing is to purify the petunse and kaolin; which, for the first, is done after the manner already described in preparing the squares. For the second, as its softness makes it dissolve easily, it is sufficient, without breaking it, to plunge it in an urn full of water in an open basket. The dregs that remain are perfectly useless, and are emptied out of the work-house when a quantity is got together.

The work-houses are properly vast yards walled round, with sheds and other conveniences for the workmen to work under; as well as other buildings for them to live in. It is almost inconceivable what number of persons are employed in these works; there being scarce a piece of porcelain but passes through above twenty hands, before it comes to the painter's work-house; and above sixty before it be brought to perfection.

To make a just mixture of petunse and kaolin, regard must be had to the fineness of the porcelain to be made; for the finer porcelains, they use equal quantities; four parts of kaolin to six of petunse, for moderate ones; and never less than one of kaolin to three of petunse, for the coarsest.

The hardest part of the work is the kneading and tewing the two earths together; which is done in a kind of large basons, or pits, well paved, and cemented, in which the work-

men trample continually with their feet, relieving one another, till the mass be well mixed, grow hard, and become of the consistence required to be used by the potter.

The earth, when taken out of the basons, is kneaded a second time, but piece-meal, and with the hands, on large slates for the purpose; and on this preparation, in effect, it is, that the perfection of the work depends; the least heterogeneous body remaining in the matter, or the least vacuity that may be found in it, being enough to spoil the whole. The smallest grain of sand, nay, sometimes a single hair, shall make the porcelain crack, splinter, run, or warp.

The porcelain is fashioned or formed either with the wheel, like our earthen ware, or in moulds. See POTTERY.

Smooth pieces, as cups, urns, dishes, &c. are made with the wheel. The rest, *i. e.* such as are in relievo, as figures of men, animals, &c. are formed in moulds, but finished with the chissel.

The large pieces are made at two operations; one half of the piece is raised on the wheel by three or four workmen, who hold it till it have acquired its figure; which done, they apply it to the other half, which has been formed in the same manner; uniting the two with porcelain earth, made liquid by adding water to it, and polishing the juncture with a kind of iron spatula.

After the same manner it is that they join the several pieces of porcelain formed in moulds, or by the hand; and after the same manner they add handles, &c. to the cups, and other works formed with the wheel.

The moulds are made after the manner of those of our sculptors; *viz.* of divers pieces, which severally give their respective figure to the several parts of the model to be represented; and which are afterwards united to form a mould for an entire figure. The earth they are made of is yellow and fat, dug out of its proper quarries, of which there is abundance about King-te-tching. It is kneaded like potters' earth, and when sufficiently mellow, fine, and moderately dry, beating it stoutly, they form it into moulds, according to the works required, either by hand, or on the wheel. These moulds are sold very dear, but they last a long time.

All the works made in moulds are finished by the hand, with several instruments proper to dig, smooth, polish, and to touch up the strokes that escape the mould; so that it is rather a work of sculpture than of pottery. There are some works on which relievos are added, ready made, as dragons, flowers, &c. others that have impressions in creux; which last are engraven with a kind of puncheons. In the general, all porcelain works are to be sheltered from the cold, their natural humidity making them liable to break when they dry unequally.

To conceive the number of hands each piece of porcelain passes through before it is perfect, we shall close this article with what F. d'Entrecolles instances of a common tea-cup, before it be fit for the painter. The cup begins with the potter, who has the management of the wheel, where it acquires its form, height, and diameter. This operator has only three farthings sterling for a plate furnished with twenty-six cups; accordingly, they go out of his hands exceedingly imperfect, especially towards the feet, which are only unformed lumps of earth, to be afterwards cut with a chissel, when the cup is dry. When it comes from the wheel, the cup is received by a second workman, who fits it to its base. A third takes it immediately from him, and applies it on a mould, to bring it to its true form. This mould is on a kind of lathe. A fourth workman polishes the cup with a chissel, especially about the edges; and brings it to the thinness necessary to make it transparent; in doing which, he moistens it

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it from time to time, lest its dryness should make it break. When of its proper thickness, another workman turns it gently on a mould, to smooth its inside; taking great care that it be done equably, lest any cavity be formed, or it warp. Other workmen add some ornaments in relieve; others, impressions in creux; others, only handles; as the quality of the cup requires. At last, they round and hollow the foot on the inside with the chissel; which is the function of a particular artist, who does nothing else.

This multiplicity of workmen is so far from retarding the work, that it is found, by experience, to go on the faster for it; as well as to be the better done; each workman, by a continual attention to the same thing, becoming very dexterous at it; besides saving the time of changing instruments, &c.

PORCELAIN, Painting of. The Chinese painters, especially those that meddle with human figures, our author observes, are all bad workmen; he adds, that the defect is scarcely any where so sensible as in the whapey, or porcelain painters, among whom, setting aside flowers and landscapes, which are sometimes tolerable, the greatest masters are not to be compared to ordinary apprentices among the Europeans, for the beauty and justness of design. But it is otherwise with the colours these whapey use; which are so exceedingly lively and brilliant, that there are but little hopes our workmen should ever come to vie with them.

The painting work is distributed among a great number of workmen, in the same laboratory: to one it belongs to form the coloured circle about the edges of the porcelain; another traces out flowers, which another paints: this is for waters and mountains alone; that for birds and other animals; and a third for human figures.

There are porcelains made of all colours: both with regard to the grounds, and to the representations upon them. As to the colour of landscapes, &c. some are simple; such are all blues, which are those most usually seen in Europe; others are mixed up of several tints; and others, again, are heightened with gold.

The Chinese, for a great many ages, used only white porcelain. The first colour they employed was blue, and after that they came into the use of all the rest. Their ancient blues were prepared by themselves from a kind of lapis lazuli; but we now supply them with the smalt so much cheaper, that it is no longer worth their while to make it themselves. They used to prepare this only by giving a gentle calcination to the stone, and then beating it to powder, and grinding it to the utmost fineness in mortars of unglazed porcelain ware, with pestles of the same.

The fine deep blue of the old porcelain ware of China is much valued by the curious; and it is much lamented, that the same colour is not used at this time. The art seems at present to be lost; but perhaps it might be recovered by trials.

It is certain that the Chinese have cobalt among them, and very probably they used a blue colour prepared from this, before they had any commerce with us: notwithstanding all the conjectures about their materials for colouring, this seems the most probable substance; and there is a way of preparing a colour from this, much superior to that now in use, which we call smalt.

Cobalt is a mineral containing arsenic, and a blue vitriifiable earth. The common way of preparing smalt is, by roasting this cobalt in a reverberatory fire. This disposes it to vitrify, and drives off the arsenic it contains in fumes, which, collected at the top, form true flowers of arsenic. It is very certain, however, from experiments, that if this arsenic could be preserved in the cobalt, the smalt would be

of a much finer colour; for there are some kinds of cobalt which yield smalt without previous roasting; and as the arsenic is in a great measure contained in these, the smalts are much finer coloured.

Arsenic added to smalt, while in fusion, greatly exalts its colour also; and there is a way of procuring smalt from cobalt without fire, only by dissolving it in an acid, and precipitating that solution with oil of tartar. The smalt thus precipitated to the bottom, is of a much finer colour than any prepared by fire; but it is much more expensive, and prepared in less quantity. It is very possible that the Chinese might have the art of making this kind of smalt before they knew us, and that to this was owing the fine blue of their porcelain ware: but when we trafficked with them, and they purchased smalt so much cheaper of us than they could make it themselves, they naturally discontinued the manufacture of their own finer kind, without considering how greatly inferior the colour was which the other yielded. If this be the case, it will be easy to revive this art, and the adding the true old china blue to our European manufactures, in imitation of porcelain, may give them a value which they have not at present.

The red, which the Chinese use, is made of our green vitriol, or common copperas, which they call *tfa-fan*. They put about a pound of this into a crucible; and lute on this another crucible inverted: this last has a hole cut in the top, which they keep covered or open at pleasure. They set this crucible in a furnace of bricks, so contrived, as to throw all the flame upon the lower vessel, in the way of our chemists' reverberatory furnaces. They make a large fire of charcoal all round it, and observe the hole at the top; for so long as there ascend thick black fumes through that, the matter is not sufficiently calcined. They watch the going off of this fume, and when there appears in the place of it a fine and thin cloud, they take away the crucible, the matter being then sufficiently burnt. They try this, however, by taking a little out, and examining the colour; if it is not sufficiently red, they let it remain longer in the fire. When they find that it is of a good colour; they take away the fire, and leave the vessels to cool; this done, they find a cake of red matter at the bottom of the crucible, and a quantity of a finer powder about its sides. They keep these separate, the latter being the purest, the finest, and the brightest colour.

One pound of copperas affords about four ounces of this colour, and this is the red which they manage in different shades, and vary so much. See *Blown RED*.

The Chinese have also a white colour, which they use in their figures painted on the china: the ware itself is naturally white, and the varnish, or oil of stone, is a great addition to its whiteness all over. But they have yet a way of making a much brighter and finer white than these, as may be seen in most of the fine china-ware, where there is any white in the figures. This white is made in the following manner: they collect on the shores of their rivers a sort of flint or agate, which is of a whitish hue, without veins, and tolerably transparent. It approaches very much to the nature of crystal, and probably crystal may be found to supply its place with us. They calcine this stone to a white powder, and to every ounce of this, when ground in their porcelain mortars to an impalpable fineness, they add two ounces of ceruss in fine powder: this they mix with the varnish, and lay on in the common way of other colours. This white mixture serves not only for the colouring white, but it is the basis of several other of those beautiful colours which we see on the china-ware, and which our manufacturers have been often perplexed what to make of. Their green colour

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is made of copper rusted with acid ; and their fine deep violet colour is made of this green, by adding to it a due proportion of this white. It is not to be supposed that this effect is produced according to the common laws of mixing colours among our painters, for then the white and green would only make a paler green. But copper being a metal that as well gives a fine blue as a fine green, according to the nature of the substances it is mixed with, the white in this case alters the very nature of the green, and converts it into that fine and deep violet blue, which we may draw from copper by means of any of the volatile alkalies, such as spirit of sal ammoniac, spirit of hartshorn, spirit of urine, or any the like liquor. The workmen know how to bring this blue to any degree, by putting in different proportions of the two colours. There is not any admixture of them, that will not produce a blue of some kind ; but always the more of the green colour is used, the deeper the blue will be, and the less the paler. The yellow is made of an admixture of several drachms of this white, and three drachms of copperas, or more if they desire the colour to be deeper.

Most of these colours are mixed with gum water, for application ; with a little salt-petre, sometimes cerufs, or copperas, but more usually copperas alone, being first dissolved in the water. Indeed for porcelain, that are to be quite red, the colour is usually applied with oil ; *i. e.* with the common oil of the porcelain, or another made of the white flints.

These colours are laid upon the vessels when they have been once baked, but they do not appear till the second baking is over in their proper shades or tinges, and sometimes scarcely at all.

The black china called *umiam*, is much esteemed in the East, and particularly when it is ornamented with gold ; this colour looking better with that ornament than any other. The black is always laid on when the porcelain is first dried, and is prepared by mixing three ounces of the fine deep blue, with seven ounces of that fine varnish which they call *oil of stones*. This admixture gives a fine deep black ; but the proportion is varied, as the colour is designed to be more or less deep. When the colour is thoroughly dry, the vessels are baked, and when this is done, the gold is laid on, and the whole is baked again in a particular furnace made for this purpose.

The gold on this ware is never laid on alone, but managed in the following manner: they grind it in water to a fine powder, and leave it to dry in the shade ; they then mix with every ten grains of gold one grain of cerufs, and incorporating the whole with gum-water, they lay it on in the manner of other colours. See *GILDING of China-ware*.

If they would have the black degenerate into blue, they need only add less of the blue, and a little of the cerufs and agate white before described. They have two peculiar ways of applying the red, besides the common one, both which require a nice workman, and make the ware come very dear. They call one of these oils *red*, and the other *blown red*, which is very rare and of great price.

There is likewise a kind of marbled porcelain, called by the Chinese, who are very fond of it, *tsou tchi*.

It is generally plain white, sometimes blue, and has exactly the appearance of a piece of china which had been first broken, and then had all the pieces cemented in their places again, and covered with the original varnish. The manner of preparing it is easy, and might be imitated with us. Instead of the common varnish of the china-ware, which is made of what they call oil of stone and oil of fern mixed together, they cover this with a simple thing made

only of a sort of coarse agates calcined to a white powder, and separated from the grosser parts by means of water, after long grinding in mortars. When the powder has been thus prepared, it is left moist, or in form of a sort of cream, with the last water that is suffered to remain in it, and this is used as the varnish. Our crystal would serve fully as well as these coarse agates, and the method of preparation is perfectly easy.

The occasion of the singular appearance of this sort of porcelain is, that the varnish never spreads evenly, but runs into ridges and veins. These often run naturally into a sort of mosaic work, which can scarcely be taken for the effect of chance. If the marbled china be desired blue, they first give it a general coat of this colour, by dipping the vessel into a blue varnish ; and when this is thoroughly dry, they add another coat of this agate-oil. See *PARTY-China*.

There are several other kinds of porcelain ; but they are such as are rather for curiosity than use : the prettiest are the magic porcelains, whose colours only appear when filled with water, or some other clear liquor. These are made double ; the outside is white, and all laid out in compartments ; the inside is a solid cup of coloured porcelain ; though the cup is sometimes of glass, which has a better effect than porcelain.

The Chinese called this sort of china-ware *kiatsem*, that is to say, the concealed blue china.

The art is now in a great measure lost ; but there may be some guess made as to the manner in which it might be done at this time. The vessels which are to be made in this manner must be very thin : the colour must be laid on in the form of fish, or other animals or figures, on the inside, after the vessel has been once baked. After this colour has had time to dry, the inside of the vessel must have a second coat of the same earth, or stone-ware, of which the vessel is made ; and over this a varnish of the common kind. The consequence of this will be, that the figures of the fish, in a very strong colour, will be buried between two coats of the ware, which together form a complete vessel. The outside is then to be ground down almost to the figures, and when they begin to appear, a new coat of the varnish must be laid over this. The figures will then be obscure, and scarcely, if at all, perceivable ; but on filling the vessel with water, the transparency of the sides will be taken off, and the liquor will make a sort of foil behind, which will throw out the figures of the fish. This might be done in any ware tolerably clear and transparent. The porcelain of China would succeed better with it ; but the pains and nicety required are too great, and all the attempts lately made by them have miscarried.

The Chinese make a great variety of figures on the surfaces of the vases of white china-ware, and there is one kind of this greatly in esteem among them, in which there are flowers and other figures ; yet the surface is quite smooth, and the substance extremely thin. The manner of making it is this ; they first form the vessel of the finest materials, as thin as they can ; then, when they have polished it, inside and out, at the wheel, they put into it a stamp of its own shape, but cut with all these figures : they press this down so firmly on the yet moist vessel, that the impression is received in a very perfect manner ; and if the shape of the vessel be at all hurt, they take it into the wheel again to restore it. They then finish it with the knife and scissars ; and when they have made it as perfect as can be, they cover it with the fine white varnish within and without. This fills up all the cavities of the impression, and gives a perfectly smooth and even surface ; yet the thickness of this varnish

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in the traces of the figures gives it a different white, and the whole figures are as finely and accurately seen, as if painted on the outside. This is an artifice that might easily be brought to bear among us, and several of our finer wares would make a pretty figure with it.

There are many things practised by the Chinese in their colouring and forming the several kinds of porcelain, which may be well brought into use among us, and give a new value to our own wares, even though we should never arrive at their art of making the thing itself. One kind of colouring easily introduced among us, would be what they call *hoan ton hoan*. This produces vessels of great beauty and price, and is done in this manner. The matter of which the vessels are made, for this purpose, need not be fine; they usually take any of the common vessels baked, without having been varnished, and consequently simply white, and without lustre. When these are intended to be of one simple colour, they need only be plunged into a liquid varnish of oil, as the workmen there call it, coloured with such ingredients as will strike the most lively tinges; but if it is to be coloured in compartments, as is usually the custom with this sort of china, it is to be done by the pencil. The usual way is to paint these in pannels, one green, another blue, and so on, and they make a very agreeable appearance. There requires no more to this, than the laying on the colours tolerably thick with a large pencil; but if the pictures of animals and plants are to be given, they are to be done with the most permanent colours, and the vessel being again well baked, becomes very beautiful.

The Chinese, who are deceivers in every thing, find the way of cheating very much in regard to this sort of china-ware. They paint the flowers of plants, and some parts of the birds, &c. in very bright colours, after the vessel has been baked. Vermilion is a fine colour, which they often add on this occasion; but they cannot use this before the baking, because it would be destroyed by the fire. These colours which are laid on afterwards cannot last, but soon rub off in the wiping, or using the things; the others last for ever; for they are laid on with the greatest heat of all, the vessels being put into the same furnaces to lay on these, as the other things are baked in for the first time.

Salt-petre, and powder of flints, are generally the things added to the colours thus laid on, to make them penetrate, and run properly. Thus, for the fine deep violet colour, which makes the greatest figure of all others on this ware, they mix together equal quantities of the fine azure, the powder of flints and salt-petre, all first powdered separately till perfectly fine; this is tempered with water, and then laid on with a pencil, and though it looks rough at first, it comes out of the furnace of as beautiful a glossy hue as any thing can be conceived. The yellow is made by mixing together three ounces of cerufs, and three ounces of powdered flints, and adding three, four, or more drachms of the red copperas, till the whole is of the proper degree of colour.

The white is composed only of powder of flints and cerufs, with a small admixture of the salt-petre, or it will succeed tolerably well without. These are all the particulars necessary to be observed for the making a sort of porcelain of great beauty, in which the nature of the ware itself is not concerned; so that it seems easy to imitate it with any of our own wares. *Obs. sur les Coûtumes de l'Asie*, p. 320, &c.

The several kinds of porcelains above-mentioned, being quite painted, with their several colours, and all the colours dry, are to be polished, to prepare them to receive the oil or varnish; which is done with a pencil of very fine feathers,

moistened with water, and passed lightly over, to take off even the smallest inequalities.

The oiling or varnishing is the last preparation of the porcelain, before it be carried to the oven: this is applied more or less thick, and seldomer or oftener repeated, according to the quality of the work. For thin fine porcelain, they give two very thin couches: to others one; but that one equivalent to the other two. There is much art in applying the varnish, both that it be done equally, and not in too great quantity. The couches on the inside are given by asperision, *i. e.* by casting in as much varnish as is necessary: those on the outside by immersion, or by plunging the pieces in a vessel of oil.

It must be observed, that the foot is not yet formed, but continues in a mere mass, till the work has been varnished: it is at length finished on the wheel, and when hollowed, a little circle is painted in it, and sometimes a Chinese character. This painting being dry, the foot is varnished, and the work now carried to the oven to be baked.

The varnish they lay on is so thick, that it often hides the colours, till the baking afterwards brings them out again: this is the case with the fine deep blues; we see none on the best china; it is all hid under the coat of white, and the vessel appears plain, till it has passed through the fire again; but then the colour appears deeper than when at first laid on. See *HOACHE*.

The china varnishes have been always famous; the manner of making which is said to be as follows: Take crude varnish, sixty ounces; common water, the same quantity: mix them well together till the water disappears; afterwards put this into a wooden vessel five or six palms long, and two or three broad; mix them together with a wooden spatula, for a whole day in the summer's sun, for two days if in the winter, and afterwards keep it in an earthen vessel, covered with a bladder. The water will not separate again: this is called the sun varnish.

The oil of wood, called by the Portuguese *azeile de pao*, is made in the following manner: Take twenty ounces of that oil, which they call oil of wood; and ten drachms of the oil of the fruit; boil these a little together, and the oil will look yellow; then let it cool, and add to it five drachms of quick-lime powdered. To make the first grounds, called *camiseca*, take swine's blood and quick-lime powdered, of each an equal quantity; spread this mixture upon the wood, and when it is dry, smooth it with pumice-stones.

To make the black varnish: Take the varnish prepared in the sun, sixty ounces; stone black alum (supposed to be a sort of copperas) dissolved in a little water, three drachms; and seventy drachms of lamp oil, called by the Portuguese *azeile de Candea*. These things are all to be mixed together in a wooden vessel, putting the lamp oil in at twice, and stirring the whole together with a wooden spatula.

The pitch-coloured varnish is made in the following manner: Take oil of wood, crude, forty drachms, called *da pao*; of the lamp oil, called *da Candea*, crude, forty drachms; mix them together in the sun in a wooden vessel, in the same manner as the common varnish and water are ordered to be mixed in the first process.

To make the red varnish: Take ten drachms of cinnabar, twenty drachms of prepared varnish, and a little lamp-oil; mix them all together.

To make a yellow varnish: Take of the yellow colour ten drachms, prepared varnish thirty drachms, a little lamp-oil; mix all together.

To make the varnish of a musk colour: Take of the red varnish ten drachms, and of the black varnish four drachms; mix them well together. *Phil. Transf. N^o 261. p. 524.*

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These are the accounts sent to the great duke of Tuscany by the Jesuits in China. Dr. William Sherard communicated them to the Royal Society; and to render the accounts useful to the world, he presented them with the several substances mentioned; these are deposited in the museum of the society, and may serve as instructions to all who are curious in this art.

The Chinese have of late years discovered a new kind of varnish for their ware: they call this *tsékinyeou*, that is to say, the brownish gold varnish; it is of the colour of the brown images, or of what we call coffee colour. The novelty of this has made it much esteemed: it is made in the manner of all their other varnishes, by dissolving the finer part of an earthy substance in water.

The substance which they make it of is a common yellow earth: this they dissolve in water, and letting the coarse parts settle, they pour off the yet thick liquor, and what afterwards subsides from this is the pure and fine part, which they keep in form of a soft paste, or thick cream. They use this only to the thinnest and most delicate porcelain ware.

The manner of using it is this: they mix a quantity of this fine sediment with so much water as renders it thin and liquid, like the common varnish: this and the common kind are to be used together, so that care must be taken that they are nicely of the same degree of thickness: this the workmen try by dipping a petunse or brick of their earth into both, and seeing which comes out most covered; that which lies on the thickest is to be diluted with more water, or the other to be heightened with more of the earth, to bring them to the same standard. They are both judged to be sufficiently liquid when they enter the pores of the petunse. They then mix some of the oil of fern ashes and lime along with the brown varnish, and add as much of this mixture to the common varnish as they find upon trial will give such a colour as is required. The common proportion for the brown colour most esteemed at present, is two pints of the brown varnish to eight pints of the common; and to four pints of this mixture they add one pint of the varnish, or oil of fern. It might puzzle a stranger to their terms, to understand what these people meant by oil; but it is a word with them in use for any thing liquid; and they call all their varnishes so, though made of the powders of earths and stones mixed with water. They apply this varnish to the vessels by dipping them into it, and so completely covering them inside and out before they put them into the oven; and the baking gives a great brightness to the colour. This is the nicest part of the whole manufacture of the porcelain, and other wares of that kind.

The varnishes used by the Chinese are two; the one they call *oil of STONES*, the other *oil of FERN*; which see. They mix these together, and with great caution and delicacy apply them to the vessels all over equally, with a steady hand and a fine pencil.

PORCELAIN, Baking or Nealing of. There are two kinds of ovens used in baking porcelain; large ones, for works that are only used to come to the fire once, which is the common way; and small ones, for such as require a double baking.

The large ones are two Chinese fathoms deep, and almost four wide. They are formed of a mixture of three earths; one of which, yellow and common, makes the basis; the two others are scarcer, and dug out of deep mines, in which people can only work in winter. One of them, called *loutou*, is a very strong stiff earth; the other, *youtou*, oily.

The sides and roof of the ovens are so thick, that one

may lay the hand on them, when the fire is at its height, without danger of burning. At the top of the dome, which is in form of a tunnel, is a large aperture, to give vent to the flames and smoke, which mount up incessantly, as soon as fire is once set to the oven: beside the principal aperture, there are four or five small ones around; which, by being opened and shut, serve to augment or diminish the heat; like the holes in the chemists' furnaces, called *registers*. The hearth, which takes up the whole breadth of the oven, is placed in front, precisely against the opening of the door, and is two or three feet deep, and two broad; people passing over it on a plank, to go into the furnace to range the porcelain. As soon as the fire is lighted, the door is walled up, only leaving an aperture for the conveyance of wood. Lastly, the bottom of the oven is covered with sand, in which part of the first porcelain cases are buried. The oven itself is usually placed at the extremity of a long, narrow vestibule, which serves in lieu of bellows; the cold air and wind being thus driven directly in the face of each oven.

Each piece of porcelain of any note, is disposed in the furnace, in its peculiar separate case, or coffin. Indeed, as to tea-dishes, &c. the same case serves for several. The cases are all of the same matter with the oven; they have no lids, but serve each other mutually; the bottom of a second case fitting into the aperture of the first; and thus successively to the top of each column. Each coffin, which is usually of a cylindrical form, that the fire may communicate itself more equably to the porcelains inclosed, has, at bottom, a little lay of very fine sand, covered over with dust of kaolin, that the sand may not stick to the work; and care is taken, that the porcelain may not touch the sides of the case. In the larger cases, which hold the small pieces, they leave the middle vacant, in regard porcelains placed there would want the necessary heat. Each of these little pieces is mounted on a little mass of earth, of the thickness of two crowns, covered with powder of kaolin.

F. d'Entrecolles observes, that the porcelains are put in cases to prevent any diminution of lustre from the too violent effect of a naked fire; adding, that it is owing to those thick veils, that the beauty, or, as he calls it, the complexion of the porcelains, is not tanned by the heat of the fire.

As fast as the cases are filled, a workman ranges them in the cavity of the furnace; forming them into piles, or columns, of which those in the middle are, at least, seven feet high: the two cases at the bottom of each column are left empty, because being partly sunk in the sand, the fire has the less effect on them; and, for the same reason, the uppermost one is left empty. In this manner is the whole cavity of the oven filled with columns, excepting that part precisely under the grand aperture. In ranging the cases, they observe always to place the finest piles of porcelain in the centre, the coarsest at the bottom, and those that are high-coloured, and consist of as much petunse as kaolin, and in which the worst oil is used, at the mouth.

These piles are all placed very near one another, and are bound together at top, at bottom, and in the middle, by pieces of earth, in such manner as that the flame may have a free passage among them, and insinuate equally on all sides; in which a great part of the workman's art lies, and on which the perfection of the porcelain much depends. Another thing to be observed is, that an oven must never be set altogether with new coffins; but half one, half the other: the old ones at the bottoms and tops of the pile, and the new ones in the middle. Indeed it were better to have them all burnt in an oven apart, before they come to be

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be used for porcelain, as was anciently done. The cases, our author observes, are brought ready prepared from a large village on the river, a league distant from King-te-tching. Before they are burnt, they are yellow; and afterwards of a dark red.

When the oven is filled, they wall up the door, only leaving a small aperture for the throwing in of little pieces of wood, a foot long, but very slender, to keep up the fire: it is then heated by degrees for the space of a day and night; after which, two men, who relieve one another, continue to throw in wood without any intermission. To know when the porcelain is baked enough, they open one of the lesser holes of the oven, and with a pair of tongs take off the lid of one of the piles. If the fire appears very brisk and clear, and the piles equally inflamed, and especially if the colours of the porcelain, that is uncovered, dart forth a noble lustre, the coction is sufficient; they discontinue the fire, and wall up what remained of the door of the furnace.

If the oven be only filled with small porcelain, they take them out twelve or fifteen hours after the fire is extinct: if it be filled with larger, they defer opening it for two or three days. In this the modern practice differs from the ancient; in which the door was not opened till after ten days for the large pieces, and five for the small ones. One thing very surprising, and almost inconceivable, F. d'Entrecolles observes, is, that there are never found any ashes on the hearth of the oven, what quantity of wood soever is consumed. He adds another thing, which with him passes for equally strange, that the workmen employed about the furnaces, slake their thirst by continually drinking hot tea, with salt dissolved in it.

The Chinese make another kind of porcelain, which they paint and bake twice; and for this second baking they have a kind of little ovens on purpose. These ovens, when very small, are made of iron; or otherwise of a kind of bricks an inch thick, a foot high, and half a foot broad, made of the same earth with the porcelain cases. The biggest of these ovens do not exceed five feet in height, and three in diameter; and being made much in form of bee-hives, the bricks are arched a little, to form the curvity the better. The hearth is of earth half a foot high, formed of two or three ranges of bricks; and on this massive is the oven built. Around the oven, at the distance of about half a foot, is raised a shell of common bricks, joined to the oven itself by a kind of arc-boutant of earth, which serves to strengthen it. They usually build four or five of these ovens at equal distances from each other. At the bottom of the shell are holes to give air to the fire when lighted: at top is an aperture, which they cover up with a piece of the baked earth, when the porcelains are laid in the oven.

The porcelains here are not inclosed in coffins, as in the common ovens; the oven itself serving that purpose, and being so exactly closed, that they receive no other impression of the fire, but that of the heat of the charcoal disposed in the hearth, at the bottom of the oven, as well as at top of the vault, and in the interval between the oven and the shell, or brick-wall.

To prepare the porcelains for a second baking, they must have had their varnish in the common manner, and have passed the great oven: in this state they are painted with various colours, after which, without giving them any new varnish, they are ranged in piles in the little oven; setting the little ones over the larger, in form of pyramids.

The Chinese are very artful in their disposition of these, arranging them in the most compact manner, and putting

the little ones within the great ones; but great care is also necessary, that the vessels do not touch one another in the parts where they are painted, for the consequence of that would be the spoiling of both vessels, as the colours would run together. The bottom of one vessel may generally be placed on the bottom of another, though both are painted, because the rims are not painted, and they keep the painted parts from touching one another. High and narrow vessels, such as chocolate-cups, and the like, are very troublesome on this occasion. The method the Chinese workmen take with them, is this: they place a range of them, so as to cover the whole bottom of the furnace, and they cover this with a thin bed of broken china-ware, over which they place another row of the cups, and so on to the top, where they lay on no covering; they never bake any thing else with these cups, when they are of this kind of twice-baked porcelain.

This second baking is sometimes intended to preserve the lustre of the colours the better, and at the same time to give them a kind of relieve; but more usually its design is to hide defective places, by covering them over with colours; but the artifice is easily found out, by passing the hand over them.

When the workman judges his porcelains enough baked, he takes off the piece that covers the aperture; takes out the charcoal; and, when the oven is cold, the porcelain is so too.

How beautiful soever the modern porcelain may be, the taste for antiquity, which reigns in China, as well as in Europe, gives the ancient porcelain a value far above that of the modern.

It must be owned, the ancient seems finer as to the matter, more perfect as to the baking, and of a more pleasant cast, both as to the white of the ground, and the other colours; yet it is certain, the most able and discerning may be deceived in it; and there are workmen who make it their business to counterfeit the ancient porcelain, called *kutong*, in the modern.

The matter of the false *kutong* is a soft and yellowish earth, found near King-te-tching. There is nothing particular in the first part of the process, except that they are made thicker, and that they are varnished with an oil drawn from the yellow-stone, mixed with the common oil, which gives them a kind of sea-green hue. When taken out of the oven they throw it into a fatty broth, made of capons, &c., in which they boil it a second time; they then bury it in the filthiest sink they can find, for a month or six weeks, or more, according as they would give it the greater appearance of antiquity. Besides their thickness, and their colour, these false antiques resemble the true ones in this, that they do not resound when struck, nor even give the least buzz when held to the ear.

Notwithstanding the vast quantity of porcelains made in almost all the provinces of the empire of China, they still continue very dear, though not near so dear as anciently. The Chinese annals tell us of times, in which a single urn cost ninety or a hundred crowns on the spot. What chiefly occasions the extraordinary price of this commodity, especially in Europe, is, beside the great profits of the merchant in Europe, and their factors in China, that it rarely happens an oven succeeds throughout; that it is frequently quite spoiled, so that upon opening it, in lieu of fine porcelains, is found a hard unformed mass, into which both the porcelains, and their coffins, are converted, either by excess of heat, or some ill qualities in the matter.

Another reason of the dearness of porcelain is, that the ingredients it is made of, and the wood with which it

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is burnt, grow more and more scarce. One may add a third reason for the excessive price of porcelains to the Europeans; and it is this: that most of those sent to Europe are formed on new models, frequently very capricious, and difficult to succeed in; which yet for the smallest defects are turned on the manufacturer's hands; and he, not being able to dispose of them to the Chinese, because not to their taste, nor to their use, is forced to charge the porcelain he delivers the higher, to pay himself for those refused.

The art of making porcelain is one of those in which Europe has been excelled by oriental nations. However, earthen-wares have been made, for several years past, in different parts of Europe, so like the oriental, that they have acquired the name of porcelain. The first European porcelains are said to have been made in Saxony and in France; and afterwards in England, Germany, and Italy; all of which differed from those of Japan and China, but each possessing its peculiar character. The first person, who seems to have made this manufacture the object of scientific attention, was M. Reaumur; and he communicated his researches in two Memoirs to the Academy of Sciences, in 1727 and 1729. Having broken pieces of the Japanese, Saxon, and French porcelains, he examined the difference of their grains or internal structure. The grain of the Japanese porcelain appeared to him to be fine, close, compact, moderately smooth, and somewhat shining. The grain of the Saxon porcelain was found to be still more compact, not granulous, smooth, and shining like enamel. And the porcelain of St. Cloud had a grain much less close and fine than that of Japan, shining little or not at all, and resembling the grain of sugar. In order to determine their difference still farther, he exposed them to a violent heat; and found that the Japanese porcelain was unaltered by the fire, and all the European porcelains were melted. This essential difference suggested to him the most just and regular idea, that has yet been formed of the porcelain or china-ware, *viz.* that it is a half vitrified substance or manufacture, in a middle state between the common baked earthen-ware of our vulgar manufactures, and true glass. This is the essential and distinctive character of porcelain; and it is only by considering it in this light, that we are to hope to arrive at the perfect art of imitating it in Europe.

The determining the due degree of heat for the baking the china-ware, and the finding out the proper time it should remain in that heat, are two very essential points in the manufacture of this elegant ware. Perhaps our English attempts to imitate it would be brought nearer the perfection we are aiming at, by a just regard to these particulars, than by many other less material articles, about which we seem more solicitous.

This attempt is to be made on these principles in two different manners: the one by finding some appropriated matter on which fire acts with more than ordinary strength, in the time of its passing from the common baked state of earthen-ware into that of glass. The other is to compose a paste of two substances reduced to powder: the one of which shall be of force to resist a very violent fire, so as not to become vitrified in it; and the other, a matter very easily vitrifiable.

In the first case, the matter is to be taken out of the fire at the time when it is imperfectly vitrified; and in the other, the compound mass is to remain in the furnace till the one substance, which is the more easily vitrifiable, is truly vitrified; and being then taken out, the whole will be what porcelain is, a substance in part vitrified, but not wholly so.

The first method is that by which the European porcelain

has generally been made; and though that of St. Cloud, and some other places, has been very beautiful, yet it is always easy to distinguish even the finest of it from the china-ware, and the nature of the two substances appears evidently different; these owing all their beauty to their near approach to vitrification, are made to endure a long and violent fire, and are taken from it at a time when a very little longer continuance would have made them perfect glass: on the contrary, the china-ware being made of a paste, part of which is made of a substance in itself scarcely possible to be vitrified, bears the fire in a yet much more intense degree than ours, and is in no danger of running wholly into glass from it.

The two substances used by the Chinese are well known by the names of *petunse* and *kaolin*; and on examining these, it appears very evident that we have in Europe the very same substances, or at least substances of the very same nature, and capable of being wrought into a porcelain equally beautiful and fine. *Mém. Acad. Scienc. Par. 1739.* See *KAOLIN* and *PETUNSE*.

These are the two different semi-vitrifications, on one or other of which all the European manufactures have hitherto been founded; and it is easy from the knowledge of these principles to determine, on breaking a piece of the china of any of our manufacturers, by which of the two processes it is made. If it is made by seizing the half-vitrified mass of a substance, which would soon after have been wholly vitrified, then the putting it in a crucible, into an equal degree of fire, will soon turn it wholly into glass. This is the case of most of our European porcelain; but if it be made of two ingredients, the one of which is not vitrifiable, or at least not by such fires, then the matter will melt, but will not vitrify. This is the case with the Chinese porcelain, which if kept in fusion a long time, yet when cold is china-ware still; so that this is evidently made of two such different ingredients.

Besides these methods, there is yet another, of late invention, which makes a very beautiful china; and which, if it does not afford vessels equal to those of china, yet will afford them nearly approaching to those, and at a considerably smaller price. This method consists in reducing glass to china. See *GLASS-Porcelain*.

Macquer, the author of the *Chemical Dictionary*, observes, that M. Reaumur has erroneously confounded the Saxon porcelain with the other fusible porcelains in Europe. For though it contains, as every porcelain does, particularly that of China and Japan, a fusible substance, which has been completely fused in the operation of baking, and to which it owes its density and internal lustre; yet it contains also a large quantity of a substance absolutely infusible, from which it receives its admirable whiteness; its firmness and solidity, during the baking, supplying the place of the oriental kaolin, and contracting its dimensions in a considerable degree, while it incorporates with the fusible substance. He has actually found, that this porcelain cannot be fused, unless by a fire capable also of melting the best Japanese porcelain. And he observes, that it is superior to the oriental in the smoothness, lustre, and less granulous appearance of its internal surface. The manufacture of Saxony has been long established; and that at Meissen, a few miles from Dresden, has produced porcelains painted and enamelled in such perfection, that they have been reckoned more beautiful, and sold at a higher price than even those of China.

The invention is said to have been owing to an alchemist called Botticher, who, being confined in the castle of Königstein by the king of Poland, on a suspicion of being
master

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master of the philosopher's stone, had leisure sufficient, not indeed to make gold, but to invent a ware, which, by the excellence and value of it, considerably enriches the country. He died in 1719, but it seems that he only invented the white sort; the art of making brown and blue porcelain not having been discovered till the year 1722.

Porcelain is also made at Vienna, Frankenthal, and lately in the neighbourhood of Berlin; all which are made of the same kind of materials with those of Saxony. In Italy there are also manufactures of porcelain, at Naples, and Florence. In France they have had manufactures of this kind for many years: porcelain was made at St. Cloud, and in the suburb of St. Antoine at Paris, before M. de Reaumur's publication; but though beautiful, it was of the vitreous and fusible kind. Since that time, considerable manufactures of it have been established at Chantilly, Villeroy, and Orleans, the porcelains of which have a distinguished merit; but those produced in the king's manufactory at Seve are said to do greatest honour to France, on account of their shining, white, beautiful glazing, and coloured grounds.

M. Guettard, who has published an account of his discoveries in the Memoirs of the Academy of Sciences for the year 1765, seems to have been one of the first who, since M. Reaumur, found in France a kaolin and petunse of the same nature as the Chinese: the former is a white argillaceous earth filled with mica; the latter a hard quartzose stone. The count de Lauraguais has also so far succeeded in his attempts in this way, that some pieces, presented by him in 1766 to the Academy of Sciences, were declared to resemble the porcelain of China and Japan in solidity, grain, and infusibility, more than any other that had been made in that country, though it wants the whiteness and lustre observable in the ancient Japanese porcelain.

In the first attempt to make porcelain in France and in this country, it possessed very inferior qualities to that made in China and at Dresden: it was much more fusible, and had an open fracture. In consequence of these defects, it has been distinguished from genuine porcelain by the name of soft and tender porcelain.

It is painful to confess that we have not as yet produced any thing superior to the latter in this country. The French, till the discoveries of Reaumur and others, did not make the real porcelain.

Porcelain appears to have been first brought into Europe by the Portuguese, but at what period it is difficult to say; but doubtless long before any attempts were made by the Europeans to manufacture it.

The first attempt was, as we have already observed, by baron de Botticher, a German chemist. In making some crucibles, he found they assumed by heat the character of porcelain. This gave rise to the manufactory, which is still carried on at Dresden; and it is curious to have to remark, that their materials, from the first, proved to be similar to those employed in China.

The success of this manufactory soon produced other attempts in France and this country. It was known that the Chinese employed two substances for the body of the porcelain: one called kaolin, having the ductile properties of clay; and the other named petunse, which was a white stone, and did not produce a paste in itself.

A French missionary in China, of the name of d'Entrecolles, sent over to France specimens of the kaolin and petunse, with such instructions as he could collect. It seems that very little was gained by this. They did not at first succeed in finding similar materials in France; and if they had, the account given them by d'Entrecolles was

so defective, that it rather misled them than otherwise. Very little progress was made by the French, till the celebrated Reaumur, as we have already mentioned, investigated the subject. His first object was to examine the fracture of the different porcelains. He found the fracture of Chinese porcelain to be very compact, but slightly granular; the Dresden more compact, and resembling enamel; that of St. Cloud, which was the best attempt after the Dresden, had an open granular fracture, more resembling sugar. His next object was to ascertain their relative degrees of fusibility. He found the Chinese to withstand the greatest heat without fusion, while the others yielded to the ordinary heat of furnaces. He concluded from his experiments, that it was essential to have two substances for the formation of porcelain. The one should constitute the body or skeleton of the substance, by being infusible with the greatest heat of the furnace employed; the other substance should, at the greatest heat required, become fused, and enveloping the infusible parts, constitute the semi-transparency so conspicuous in porcelain. The first of these properties he found to exist in the kaolin, and the second in the petunse of the Chinese.

It was not, however, till after the researches of Macquer and Montigny, that the French porcelain became fit to compare with that of Dresden and the Chinese. They put the manufactory at Seve in possession of the means of employing substances similar to kaolin and petunse, with as much success as the Chinese.

If, agreeably to the principle laid down by Reaumur, porcelain is constituted of two substances, one of which is infusible, and acts as a prop or skeleton, while the other, which is fusible, cements and binds the infusible parts together; it will be easy to conceive, that a great variety of this species of earthen-ware may be formed with substances possessing different degrees of fusibility. The best and true porcelain, however, appears to be formed when the fusible part of the porcelain requires the greatest heat for that purpose. This is the petunse of the Chinese, and is similar, if not the same, with the feldspar which is found in Cornwall, and employed in most of the manufactures here. The other substance to which the porcelain mass owes its ductility, is called porcelain clay, and by some porcelain earth. This is nearly the same with the kaolin of the Chinese. Sometimes the substance known by the name of soap rock, and also called steatite, is employed with the kaolin, or porcelain clay. This is said to give firmness to the infusible part of the porcelain. A substance similar to this last is in some cases used by the Chinese. The body of the best porcelain should, therefore, be formed of certain proportions of porcelain clay with the feldspar. The less of the latter, the more difficult it will be to bring about the semi-transparency by heat. But if the feldspar were in great proportion, the vessels so formed would shrink in the fire, before the diaphanous property was produced. If vessels were made solely of the porcelain clay, without any feldspar, they would possess great whiteness and firmness, but not the least transparency. Hence this clay answers very well for crucibles or other vessels required to resist great degrees of heat. Porcelain made of the best proportions of these two substances, we have before observed, is called hard porcelain. In some parts of France, and in this country, the porcelain is made of these substances in part, but other materials are employed to give the required transparency at a lower temperature. This has received the name of soft porcelain. The receipts for making soft porcelain are very numerous; scarcely two manufacturers using the same, although each keeps his own a profound secret, and thinks it the best.

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They all use more or less of porcelain clay and feldspar. The former is often called Cornwall clay, the latter Cornwall stone. This they employ in different proportions with bone ashes. The latter constitute the infusible part, while the feldspar, which is used in greater proportion, serves to give the transparency. Some use gypsum in their composition, to give it an opal appearance. All these porcelains are so fusible, that they are obliged to be glazed with a substance containing oxyd of lead, which must ever be considered as objectionable in the manufacture of vessels used in domestic life. The true porcelain is glazed with feldspar, which can only be effected when the fabric will bear a heat sufficient to make the coating of feldspar flow thinly over the surface.

It may be proper here to state some facts respecting the porcelain clay and the feldspar, which may be a means of improving upon the materials which nature furnishes.

The Cornwall stone is a species of granite in a state of decomposition, and principally consists of feldspar. The porcelain clay is found in situations where this decomposition is constantly going on, and the clay is separated by the action of water, which washes these parts miscible with that fluid into pits made, in succession, for the purpose. In order to give some idea of the similarity between feldspar and porcelain clay, we will give the following analysis by Vauquelin.

Feldspar.	62.83	Silex
	17.02	Alumine
	3	Lime
	1	Oxyd of iron
	13	Potash
	96.85	
Porcelain clay.	55	Silex
	27	Alumine
	.5	Oxyd of iron
	14	Water
	2	Lime
	98.5	

Before it was suspected that the alkalies entered into the composition of minerals, the analysis of these two substances afforded nearly the same substances, offering very little in their proportions. In the analysis of feldspar, however, a great loss was always observed, which could not be accounted for, but which is now found to be potash. This satisfactorily explains the fact of porcelain clay, from which the alkali has been separated by the decomposition of the feldspar, being infusible with the greatest heat of furnaces; while the feldspar itself, which contains potash, melts at little more than a red heat. These facts will, no doubt, give some valuable hints to the scientific manufacturers of porcelain.

It may seem to the reader a little strange, why the soft porcelain, which is a vague and artificial composition, should be made at all, and why the simplest proportions of the clay and Cornwall stone should not be universally employed. In answer to this we may state, that in none of the manufacturing arts in which fire is an important agent, has there been less skill displayed, or less improvement made, than in the potter's kiln, which from its construction is limited to a very low degree of heat, and has besides many other defects, which must ever be an obstacle to the manufacture of porcelain. On this subject we shall give some observations in another place. We shall now proceed to

go through the different manipulations for many vessels of porcelain, which will be the same whatever may be the nature of the materials.

Previously to the different materials being mixed which are to constitute the mass from which the vessels are to be formed, they are first ground between two surfaces of chert or porphyry: the first of these is a hard siliceous stone, found in Derbyshire, and other places. The passive part of this machine consists of these stones, which occupy the bottom of a cylinder, about twelve or eighteen inches in depth, and from six to ten feet in diameter. In the middle of the cylinder works an upright shaft, with arms at right angles, on which are placed the active stones, so that by the rotation of the latter upon the passive stones, the substance, such as flint or feldspar, is ground. As much water is always present as keeps the substance grinding to the consistency of pulp.

After the substances have been ground in this way to a certain fineness, which also effects their intimate mixture, the pulp is passed through a sieve of fine silk. The operation is called *lawning*. This renders the pulp very fine, and prepares it for evaporation.

The evaporation of the water is performed in a vessel made of fire-brick; its surface is great, and the depth not more than twelve to eighteen inches. The breadth is about six feet. The fire is at one end, and the flame runs under the whole length, to the chimney at the other end. The heat is given very slowly to the pulp, till the mass will admit of being cut out with a spade in square masses. These masses are a little too soft for working, and require another operation, called *wedging* or *flapping*. This consists in separating each of these squares with the hand, and flapping them violently together on different sides to those immediately separated. This is repeated till the mass becomes perfectly uniform. In mixing water with clay or any other dry substance which requires to be thoroughly penetrated by that fluid, it is found that considerable time is necessary to do it effectually for this purpose. It is common, after the first wedging, to allow the mass to remain undisturbed for some time. This allows every part of the substance to be saturated with water, and the mass requires that degree of uniformity and tenacity, by which it is worked with greater facility. Previously to being worked it undergoes another wedging, by which it acquires the proper consistency for working into utensils of different kinds.

This branch of the art is divided into three departments, namely, throwing, pressing, and casting.

Throwing is performed upon a machine called the potter's lathe. This consists of an upright shaft, about the height of a common table, on the top of which is fixed a circular piece of wood, of a breadth sufficient for the widest vessel to stand upon. The bottom of the shaft runs in a step, and the upper part in a socket a little below the circular board, so that the shaft and the board turn together. The shaft is turned by a pulley, placed upon it by a band, which passes from it to a wheel about ten times the diameter at some distance. This latter, being turned by a handle, gives motion to the lathe. The masses to be thrown are first weighed out. The thrower places the mass on the face of the circular board, which is in motion, and shapes it by his hand and fingers previously wet, aided by the circular motion, to the desired form. He then cuts it off at the base by means of a piece of fine brass wire, with a handle at each end. The vessels thus roughly formed are placed in a situation, where they dry gradually to a certain extent. During the drying of the vessels, there is one point in which the clay possesses a greater tenacity and hardness than at any other

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other period. This is called the green state. At this period they are taken to another lathe, which, to distinguish it from the throwing lathe, is called a turning lathe. The vessel is here slightly attached to a wooden chock by wetting, and then turned into its proper shape with a very sharp tool, which gives it great smoothness at the same time. After this it is slightly burnished with a smooth steel surface. Such vessels as require to have other parts attached to them, such as handles, spouts, &c. undergo this operation when they come from the turning, this being the proper state of dryness for that purpose. The handles are first made of the proper size and shape in moulds of plaster: they are then stuck to the vessels, by means of a pulpy mass of the same material, of the consistency of thick cream. In this state it is called slip. The surface where the union is formed is then smoothed with a wet sponge. The vessels are now taken to the stove to be thoroughly dried.

When they are perfectly dry they are examined, to see if any parts be still rough; indeed, some places cannot be made perfect in the green state. The perfect finish is given by rubbing the rough parts with a small bundle of hemp.

The throwing and turning can be employed only for such utensils as are of a circular form. When the form is otherwise, recourse is had to moulds. The moulds are made of plaster, and sometimes, for delicate work, of sulphur. The clay is first made into a flat piece of the thickness of the vessel: it is then gently pressed into one-half of the mould, a similar piece being pressed into the other half. The two halves are now united together, and the plaster moulds removed. The vessels now undergo repairs, and are set to dry, to the same degree at which the thrown articles are turned. The vessels are now all finished as to their form and the different appendages, which are put to them by means of the slip. These are now fully dried, and finished by rubbing with hemp.

The casting operation consists in pouring the clay, in the state of pulp or slip, into plaster moulds, which are kept in a certain state of dryness. These moulds are made in two halves, and fit together in the same way with those used for casting metals: the pulp is poured in till the cavity is quite full, and suffered to remain for a certain time, which is more or less according to the intended thickness of the vessel: that part of the pulp which is contiguous with the plate soon loses its excess of water, which is absorbed, leaving the clay in that part so stiff, that when the unchanged pulp is poured back, a portion remains, which, when removed from the mould, constitutes a vessel, the exterior of which has the exact form of the mould; the thickness of the clay being more or less, according to the time the pulp remains in the mould.

The articles formed in this way are dried to the green state, similar to those above-mentioned, at which period the parts to be united are put together with slip.

It is in this way that the greater parts of those elegant figures and ornamental works are formed, and sold in a state of white biscuit. These are made in the greatest perfection at the Derby porcelain works. The imitation of flowers and foliage is exquisitely managed. Each of the leaves and petals being made in a separate mould, renders this kind of work very expensive.

All the various kinds of work made by the different processes, after being finished, so far as regards their shape, are placed on a stove to keep them in a hot state for burning, till there is a sufficient quantity to fill the kiln.

The next process is that of burning or firing, which consists in giving the porcelain a very considerably red or almost white heat, by which it acquires its hardness, and

possesses at the same time great whiteness, and is semi-transparent. In this state it appears like very white sugar, and it is called biscuit.

The potter's kiln, which that used for porcelain strictly resembles, is built in the form of an erect cone, with an opening at the top for the escape of smoke. A certain part within the cone is built with fire-bricks, within which the vessels containing the porcelain are piled one upon another. These vessels for defending the ware from the immediate action of the fire, are called *saggars*, which in all probability is a word corrupted from *safeguards*. They are cylindrical vessels from twelve to eighteen inches in diameter, from six to twelve inches deep, and from one inch to one and a quarter thick. These dimensions, however, vary with the size of the articles to be burnt.

The bottoms of the saggars are slightly covered with a fine white sand, which does not change by the fire. The particles act like so many little spheres, allowing the porcelain to touch the saggars' bottom only in a few points.

When the ware is put into the saggars, they are to be piled up in the kiln, each superior saggars serving as a lid to the one beneath it. These piles are by the workmen called *bungs*. Before one saggars is laid upon another, a ring of soft clay is laid upon the edge of the lower one; so that the upper one, being placed upon it, secures the ware in the same from any dust or smoke. The rings of clay so placed between the saggars, are called *wads*. The uppermost saggars is, lastly, covered by a lid, or an empty additional saggars.

The piles in the kiln being completed, the next thing is to apply the fire. This is made with wood on the continent, and probably in China; but in this country the kilns are fired with pit-coal, that producing the most flame being preferred for this purpose.

The fire-places are generally several in number, more or less, according to the size of the kiln. They are made at the bottom of the cone, on the outside, and the flame penetrates the kiln through a horizontal flue, and then ascends perpendicularly, surrounding the piles of the saggars, till it makes its exit at the opening in the top of the cone. The want of a sufficient quantity of oxygen in the body of the kiln does not afford a perfect combustion of the smoke. This not only limits the heat which is so essential, but is the cause of immense volumes of unburnt matter escaping from the chimney, to the annoyance of the surrounding country. (See the kiln described under POTTERY.) The fire is kept up from twenty-four to forty-eight hours, when the kiln is suffered to cool before the saggars are disturbed.

The porcelain is now taken from the saggars, and cleared from any particles of sand which may have adhered to it. In this state it is called biscuit. All the common earthen-ware and the soft porcelain are so porous in the state of biscuit, as to be permeable to water, and, in consequence, would be useless, without the surface being covered with glaze, in order to fill up the pores.

The glazes used for soft porcelain, and the common earthen-ware, are mixtures of some earthy substance, such as flint or clay, or both combined, with some vitrifiable metallic oxyd, in order to give it the necessary fusibility. The oxyd of lead is generally employed for this purpose, with sometimes the addition of oxyd of tin or arsenic, in order to give the glaze a certain degree of opacity. In the hard porcelain, such as that of China and Dresden, the glaze does not contain lead or other metallic oxyd, except we call potash the oxyd of a metal. The porcelain being formed of such proportions of the porcelain clay and the feldspar, as to bear a great degree of heat, a glaze may be employed, much

less fusible than those employed for the soft porcelain. The glaze of such porcelain is, therefore, the felspar alone. We have before stated, that the felspar owes its fusibility to a certain portion of potash which it contains: it might hence be inferred, that the common fusible glaze could be formed by combining potash or soda with earthy substances, in greater proportions, and thus obviate the use of oxyd of lead entirely, which, from its poisonous qualities, is very objectionable. Such an expedient has often, and is still resorted to, by the manufacturers of earthen-ware; but it is found, that when a glaze contains more than a certain proportion of alkali, it does not undergo the changes of expansion agreeably with the body on which it is laid, and is apt, in consequence, to crack. It is not uncommon to see some of the very common species of earthen-ware appear covered with cracks on the surface. Whenever this happens, the body soon becomes penetrated by grease, or any other substance applied to the vessels so glazed. The oxyd of lead, in a certain proportion, forms a more permanent glaze, and is less liable to the above objection; but we find that acids, particularly vinegar, dissolve the lead in such glaze, and has, in many instances, been productive of bad consequences. The glazing used for the soft porcelain in general contains lead, and differs very little from that used for common white earthen-ware, which is generally called white enamel. Since the substance known by this name enters into the composition of the porcelain glaze, and also into the flux used as a vehicle for the colours, we will give the process for forming white enamel, as recommended by Chaptal in his *Chemistry applied to the Arts*. Take equal parts of lead and tin, and expose them on a melted slate till they are completely oxydated. Let the powder so formed be ground with water, and well washed from any impurities, which will be known by the water being clear. This fine powder being dried, is kept free from dust. This being done, take the whitest flints, and fuse them with salt of tartar, or carbonat of potash; the latter being in such proportion to the flint, that the compound may be soluble in water. If to the solution of flint so formed, muriatic acid be added till flint ceases to be precipitated, the precipitate may be considered as pure flux. This being well washed and dried, is kept for use. Of the first preparation of tin and lead, take 100 parts; of the prepared flint, 100 parts; to these add 200 parts of carbonat of potash: fuse the whole in a clean white crucible, and pour it on a clean slate: when cold, reduce it to a fine powder, and keep it for use.

This preparation is intended for the nicest purposes. For the common earthen-ware less pains would be taken in preparing the flint and the oxyds of lead and tin. In future this preparation will be called white enamel. If the porcelain to be glazed will not bear a great heat, the white enamel may be used alone as glazing. The three following are recommended by count Milly in his work on porcelain. First, very white quartz, 8; white enamel, 15; and calcined gypsum, 9. The second is, 17 of quartz; 16 of white enamel; and 7 of gypsum. The third is, 11 of quartz; 18 of enamel; and 12 of gypsum.

These possess different degrees of fusibility, according to the lead they contain. The very hard porcelain, such as that of Dresden or China, is glazed with felspar alone: for this purpose, the felspar is reduced to a fine powder, similar to that constituting the glazé already mentioned.

Having now pointed out the material for glazing, we will shew the manner of laying it upon the biscuit, in which state we left it when taken from the kiln, and cleared from any small particles adhering to it. The material for glazing is to be mixed with water till it is about the con-

sistence of fresh cream. The powder should be extremely fine, that it may remain in suspension. The mixture, besides this, should be agitated all the time of glazing, in order to keep the fluid of an uniform thickness. The biscuit is dipped into the glaze. On taking it out, the piece of porcelain is to be turned hastily into different positions, in order that the covering may be uniform. The biscuit, from its porosity, absorbs the water from the solid part, leaving a coating which is of sufficient hardness to remain permanent till it is exposed to the fire. Those articles which are coloured in any part with cobalt, and sometimes the black or brown colours, require to be painted with the colouring matter before they are dipped in the glaze. In these instances the colours are seen to the greatest advantage through the glazing.

The next process is the firing. To fuse the glaze for this purpose, the coated ware is placed in clean faggars, such as those used in the first firing. That part of the porcelain which is to rest upon the bottom of the faggar has the glazing rubbed off. If this were not the case, the glaze would fasten it to the bottom of the faggar. The faggars are now to be piled up in the same kiln, and in the same manner as employed in the first firing, but the temperature not so high: it should be, however, just sufficient to give perfect fusion to the glaze. The heat employed for the felspar glaze, in the manufacture of hard porcelain, is much greater than for the glaze of the soft kind, although the relative degrees of the biscuiting and glazing heat may be nearly the same in each kind. In this state the porcelain has attained all its useful qualities, the painting and gilding requiring an additional process. Before we speak of the method of laying on the colour, we shall give some account of the preparation of the colouring materials, and the proper flux by which the colour is united to the body. The different colours are produced by metallic oxyds: these bodies are, in general, capable of assuming a vitreous form with different degrees of facility. The oxyd requires to be accompanied by a certain vehicle, called a flux, which has the effect of rendering the whole more fusible than the first or proper glazing already described. Some manufacturers exclude lead from their flux used with the colour, as being injurious to the colour; others employ it constantly. Certain it is, however, that in its tendency to promote the fusion of the under glaze, the colour becomes diluted, particularly when too much heat is employed.

The flux which contains lead may be formed by adding a little borax to the white enamel already described, fusing the mixture, and reducing it, when cold, to powder.

The flux given by Chaptal for this purpose consists of glass in powder, free from lead, 20 parts; calcined borax 11 parts; and purified nitre 22.

The flux, whatever may be its composition, is to be ground with some metallic oxyd into fine powder. It is then mixed with oil of lavender, or, what is cheaper and better, old oil of turpentine. The latter is merely to give that consistency to the whole, which will make it, in the best state, to be laid on the work with a camel's hair pencil.

As the preparation of the metallic oxyds to be used as colouring matter, require great nicety in their preparation, we will give some account of the best means of their preparation, before we proceed to state the different processes of painting porcelain.

Colour produced by Gold—The oxyd of gold has been considered a valuable substance in producing the carmine, rose, and purple tints. The most common preparation is the purple powder of Cassius: it is prepared by dissolving the gold

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gold in aqua regia, formed of equal parts of nitric and muriatic acids. Next dissolve tin in the same menstruum, keeping the vessel in which the solution is formed as cool as possible. The solutions of each should be perfectly clear. First dilute the solution of gold with three or four times its bulk of water; then add the solution of tin by a very little at a time: a purple precipitate will fall down. Continue to add small portions of the solution of tin till no more purple precipitate is produced. It must be observed, that the solution of tin should be kept close stopped from the air, between the intervals of using it; as the presence of oxygen would soon render it unfit for forming the purple powder. This powder is well washed by pouring hot water upon it, and drawing off the clear liquor from time to time. It is then to be dried and kept for use. The yellow oxyd of gold is sometimes used for painting. It is obtained by precipitating it from its solution by an alkali, or by lime water. The precipitate is to be washed and dried in the same way as the last, and kept for use.

When either of these substances is used, they are to be intimately ground with the flux above-mentioned, in quantity proportionate to the intensity of the colour required. The mixture is then used by some manufacturers in that state for painting. Others fuse the mixture into a glass, and again reduce it to powder. In either state it is mixed with oil of turpentine till the mixture assumes a proper state for the pencil. The figures are painted upon the glazed porcelain, the volatile part evaporates, leaving the colouring matter with a small remain of resinous. In this state the goods are ready for a third firing, to fix and bring out the colour by the fusion of the vitreous colouring matter. When the fusibility of flux is greater than common, and the heat moderate, the purple colour is produced; the rose colour requiring less flux and more heat.

The purple colour is also produced by the addition of a little more lead to the flux than is used for carmine and rose colour.

The carmine colour is also produced by means of oxyd of gold, produced by the slow decomposition of fulminating gold, and a small portion of leaf silver, or muriat of silver. The preparations of gold are chiefly confined to the manufacture of what is called tender or soft porcelain, for producing carmine, purple, and rose colours. When employed for the hard porcelain, such as that of Dresden and the French, the colours are very apt to change, from the great heat employed to bake them, and in consequence they have almost entirely ceased to be used in those manufactories.

Iron Colours.—Iron is capable of producing a variety of colours on porcelain, but it is the most celebrated for producing red and rose colour. For the latter colours it is used in the state of pure oxyd, which should be of the same colour before and after baking. It is commonly prepared for the common pottery by calcining green vitriol at a red heat, in which state it is called *colcothar* and *crocus martis*.

For the delicate colours of porcelain, it is common to prepare it with nitric acid. For this purpose, dissolve the purest iron in strong nitric acid. This acid oxydates the iron to its maximum. Let the solution be diluted, and stand till it is perfectly clear; then add a solution of carbonat of potash, till the whole of the oxyd of iron is precipitated. Wash the precipitate well with hot water. Drive off the last washing by heat, and raise the heat almost to redness: this will drive off the carbonic acid. This oxyd will now be of a fine red colour, and is fit for use. A certain portion is now mixed, and intimately ground with the flux, which is then laid on with the oil of turpentine, similar to the gold colour.

This colour is employed with great success in painting

hard porcelain for the rose and red colours, and is much preferred to gold. On the contrary, the iron colour does not answer so well for the soft porcelain, as it becomes very faint by baking, and sometimes almost disappears when the heat is great. It may appear a paradox that the iron should answer for hard porcelain, which is baked at a much greater heat than the soft; while it should totally fail with the soft, if the heat be much increased above its common heat. This fact is explained, by attributing the faintness of the colour to the softness of the under-glaze of the soft porcelain, which absorbs the colouring matter; while the hard and less fusible glaze of the hard porcelain, which is mostly feldspar, has no such effect upon the colour. The oxyd of lead, which is generally present in the flux, may also have a tendency to lessen the intensity of the colour of the iron.

Oxyd of lead, as a colour, is generally used in the state of minium (red oxyd of lead) and litharge. It is reduced to a very fine powder, and washed very clean. It is often used with oxyd of tin and flint, and sometimes potash. Its general effect, when in sufficient quantity, is to produce a yellow colour. The lead, being in small quantity, and mixed with a certain portion of oxyd of manganese, has no colour. The oxyd of lead alone fuses into a transparent glass of a beautiful yellow colour.

Oxyd of antimony is employed to give a yellow colour to porcelain. The oxyd is prepared by dissolving antimony in the state of regulus in muriatic acid, with heat, and to the clear solution add water, till no more precipitation takes place. Separate the white powder, and add to it a solution of carbonat of potash to take up the remaining acid. The white powder, well washed with hot water, and dried, will be the pure oxyd of antimony. This oxyd may be fused into a yellowish vitreous mass. If it be exposed to heat for some time, it absorbs more oxygen from the atmosphere, and becomes volatile. This oxyd, with its proper flux, which may be similar to that used for the other oxyds, produces a yellow colour. It is generally used with lead, and sometimes also tin for this colour.

Oxyd of cobalt is almost the only substance used for giving a blue colour. Its being used with so much certainty, as well as its superb colour, renders it of great importance in manufactures of porcelain and pottery. To prepare oxyd of cobalt, let the arsenical ore of pyrites be treated with nitric acid. Most of the sulphur is separated in its pure form, but some becomes converted into sulphuric acid. The latter, with the arsenic acid, formed at the expense of the nitric acid, is to be separated by the nitrat of lead, adding the latter so long as any precipitate is formed, but not more. If an excess has been added, the lead may be separated by sulphuric acid. If copper be present, separate it by a bar of iron. Precipitate the oxyd of cobalt, held in solution by carbonat of potash. If the precipitate be digested in liquid ammonia, the oxyd of cobalt and nickel, if any, will dissolve, while the others will remain. Drive off the ammonia, and add a solution of pure potash: the pure oxyd of cobalt will dissolve, leaving the nickel behind. The pure oxyd may be separated by adding an acid. This last process is to be pursued only when it is required to get the oxyd in a state of purity. The common process is to roast the ore above-mentioned, by which the arsenic and sulphur are expelled. The residuum consists of the oxyd, contaminated with a little iron, nickel, and copper, and with flux. In this state it is sold under the name of *zaffer*. This mass admits of fusion into a blue vitreous mass, which is called *smalt*. In the two latter states it is used in the colouring of common pottery. We have already observed that oxyd of cobalt, when used for the blue colour, is in general

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laid on before the glazing. This is more particularly the case when the deep blue ground in porcelain is to be formed. The greater the heat, the more intense and fine this colour becomes. Hence the blue is much better upon hard than soft porcelain. When great heat is given to it, the oxyd becomes, in some measure, volatile, since the white ground in its vicinity becomes a little tinged with its colour. The oxyd of copper has hitherto been employed for producing a green colour. There are two oxyds of this metal, one the brown or protoxyd, the other the black, containing a maximum of oxygen. The former produces a reddish-brown, the latter the green colour. The brown oxyd is generally obtained from the surface of copper by the action of heat. The brown scales which are detached from the surface are made into a fine powder. The black oxyd is best obtained by first precipitating the oxyd from a nitric solution of copper by lime water. Let the precipitate be dissolved in ammonia; then draw off the ammonia by distillation, and the black oxyd will be left in the residuum.

The brown oxyd, being melted with its flux, produces a reddish-brown glass. This, being pounded, may be used with other colours for producing the different tints of red and brown. The black oxyd, treated in the same way, produces a green colour. The oxyd of nickel has been tried in painting on enamel and porcelain, and is said to produce a green colour. The oxyd is obtained from the ore by the same method given for obtaining oxyd of cobalt. The ammoniacal solution spoken of in that process, generally contains both those metals. The residuum which the solution of potash leaves, is oxyd of nickel.

The oxyd of chrome has been tried in the manufactory at Seve by Brougniart. With the chromate of lead he produced a blue of considerable beauty. This substance is found in nature, and might be employed to advantage.

The oxyds of tin and arsenic do not produce any colours, but have the property of producing opacity when united with transparent vitreous bodies. The former, it may be remembered, is in the composition of the white enamel before-mentioned, to which it owes its milky and opal appearance. Arsenic has the same property to a certain extent. The latter, however, may be united with glass, without diminishing its transparency. The mass, when fused, becomes transparent; but when it is exposed at a red heat to the air for some time, it assumes an opaque and opal appearance. Arsenic is very seldom used in enamels, the oxyd of tin answering the same purpose: this circumstance, and also the danger in preparing arsenic, are sufficient reasons for laying it aside. With these metallic oxyds, separately or combined, all the varieties of tints which can be produced in the common methods of painting are obtained.

These may be divided into blue, purple, violet, red, rose colour, carmine, brown, orange, and yellow.

The blue is produced to the greatest advantage by the oxyd of cobalt. Its flux for soft porcelains is potash, flux, and lead; that for hard porcelain being felspar alone. The flux recommended by Chaptal, already given, would answer for the soft porcelain. In some instances it might be proper to use lead instead of borax. When lead is used, the coloured coating is less liable to crack and peel off. When borax or potash is used in sufficient quantity, the lead may be omitted.

The purple is produced on soft porcelain by the purple powder of Cassius, the flux containing a greater proportion of lead, in the absence of which the colour would incline to red. Oxyd of manganese, which is found plentifully in nature, and used for bleaching, produces a purple colour, but it is seldom used for that purpose. The

purple tint may also be produced by the mixture of red oxyd of iron with cobalt. These may also give the different states of indigo and violet.

The reds are produced in soft porcelain by a compound of one part of the purple powder of Cassius, and five or six of the flux with borax. This red, with particular management, may be varied from a carmine to the rose colour. These colours may be much modified by the use of a little leaf silver, or muriate of silver ground up with the flux. The reds of hard porcelain are produced with good effect from the red oxyd of iron. If this oxyd be mixed with an oxyd of the same metal having less oxygen, a great variety of tints may be produced from orange and carmine to purple. Indeed it may be possible to produce every possible colour with iron in different degrees of oxydation. Manganese may be employed with iron to afford a variety of tints.

Browns are produced in soft porcelain by the brown oxyd of copper, with manganese and the brown oxyd of iron. By varying the proportions of these, different shades of brown are obtained.

Orange and yellow are produced by the oxyds of lead and antimony, and different proportions of red oxyd of iron give various tints of orange. The antimony and lead produce yellows of different degrees of intensity, according to the quantity employed. Great care is required in the management of the heat; if the heat be too great, the oxygen leaves the lead and forms black spots.

In all instances the colour is to be mixed with the flux, and sometimes fused with it, and afterwards reduced to powder. This is more especially the case when oxyd of copper is employed. The powder is ground with oil of turpentine rather in a viscid state: with this substance the articles are painted. After painting they require to be baked or fired, for the purpose of fusing the matter laid on. This is not only necessary to fix it, but in most instances the colour does not appear till it becomes fused with its flux. The baking is performed in furnaces, called enamel kilns. The enameller, who has the same work to perform, uses a muffle. But in baking porcelain the furnace employed is generally made of cast iron. It consists of a cubical vessel provided with a lid: four sides are surrounded by a loose wall of brick, perforated with holes. The space between the two vessels is about four or five inches: this cavity is filled with charcoal. The outer casing is deeper than the inner, that the top may be covered with charcoal. The holes in the outer casing are to admit air for the combustion of the charcoal.

The ware is piled up in the enamel kiln on iron grates, resting on earthen props of different lengths, forming alternate strata with the grates, and the lid placed upon it. The charcoal is now set on fire at the top, and kept up till the colour is brought out. For the purpose of ascertaining when the proper effect is produced, there is an opening from the side by a tube which passes from the outer casing to the inner vessel. Small specimens are passed through this tube, having the different colours painted upon them. The tube is stopped with a plug. These specimens are withdrawn from time to time with a pair of small tongs, in order to know when the fire is to be removed. The whole is now left to cool before the porcelain is taken out.

It will be obvious, that when one colour requires to be laid upon another, this is performed by a second operation. It frequently happens that a piece of porcelain has to go into the enamel kiln four or five times, when a great variety of colours is contained in the painting.

Besides the painting, porcelain is frequently ornamented by gilding. This is performed in a manner very similar to the painting. The precipitate of gold from its solution is ground up with the oil of turpentine, and a very small quantity of the flux. The parts intended to be gilt are covered with this, similar to the painting, and are fired in the same way. The oxyd of gold, in this case, is not defended by the flux, and the oxygen flies off, leaving the gold in its metallic form, firmly fixed to the porcelain. The gold, although metallic, is dead in its appearance, and requires to be burnished. This is another department in the manufacture of porcelain. The burnishers are of hardened steel polished, and the blood stone, and are used in the same way as in burnishing gold and silver vessels. The common kinds of porcelain are painted by means of copper-plate prints. This, however, is more practised in the manufactories of the common earthen-ware. See POTTERY.

PORCELAIN Earth, or Clay, (Kaolin,) in *Mineralogy*, is referred by Kirwan to the second tribe of argillaceous earths.

Colour, white, greyish-white, or reddish, or yellowish-white.

Lustre, o. Transparency, o.

Friable and dusty, often compact.

Adheres very slightly to the tongue.

Feels soft but not greasy.

Hardness seldom exceeds 4; but lately some much harder has been found in Siberia Maquart 430. Sp. gr. (which is best taken when hardened by fire) varies with the proportion of its ingredients between 2.23 and 2.4. That of Limoges, which is worked without any mixture, has its spec. gr. 2.341. Brisson 273.

In water it immediately falls into powder. Those of Japan, and St. Iriez in France, are perfectly white; those of Saxony, reddish or yellowish; those of China, and Cornwall, are mixed with particles of talc and mica.

In general porcelain earth is infusible in our furnaces, as Cronstedt remarked; but, in manufacturing this earth, some fusible ingredient is commonly added; however, nature sometimes furnishes these ingredients with the earth, and to this compound we cannot refuse the name of porcelain earth. According to Mr. Hassenfratz, to whom mineralogy, in all its branches, and the arts connected with it, are much indebted, the porcelain earth of Limoges above mentioned contains, when dried, 0.62 filix, 0.19 argill, 0.12 magnesia, and 0.07 barofelenite. Mr. Wedgwood, in the porcelain clay of Cornwall, found on the contrary 60 per ct. argill, and only 20 of filix; this clay is therefore infusible. When dried by a summer heat, or that of a room moderately warm, it loses about $\frac{1}{10}$ of its weight; in the heat of boiling water as-much more; in that of melted lead, and thence to a strong red heat, in which copper melts $\frac{1}{10}$, in all $\frac{1}{10}$; after that no more. The matter thus lost is common and fixed air, but no inflammable air. Hence it appears to differ from the first tribe, or native argill, only in containing filix. It has been suggested, that porcelain clays derive their most estimable properties from a mixture of magnesia. Mr. Nicholson, in his Journal, vol. xii, mentions a porcelain earth, which appeared, upon analysis, to consist only of carbonate of magnesia and filix. Magnesia is said to be of use in porcelain, by diminishing the degree of contraction to which it is liable.

PORCELAIN-Shell, Porcellana, or Concha Venerea, in *Conchology*, the name of a genus of shell-fish, the characters of which are these: they are of the univalve kind, and have for their mouth a long and narrow slit, dentated on each side, and of a conglobated, oblong, gibbose, or umbonated form.

These shells are classed in the Linnæan system under the genus of *Cypræa*; which see.

This genus of shells originally had the name of *porcellana* and *concha venerea* from the resemblance of its mouth to the pudendum muliebre, called by some of the Roman writers, *porculus* and *porcellus*, and always alluded to under the word Venus. We have of late so far misunderstood the name, as to suppose it derived of the word *porcelain*, from an imagination, that the Chinese porcelain ware was made of it. Gefner has fallen into the opinion, and Aldrovand seems to have been mistaken in regard to its other name, *concha venerea*, supposing it so called because of its beauty, and therefore sacred to Venus. Rondeletius calls it the *remora Mutiani*; and the murex of the same author. Aldrovand. de Test. i. 3. p. 352. Gefner, Rondelet. de Test. i. 2. p. 102.

These shells are current in several parts of Asia, Africa, and America, as money; and they have been prescribed, pulverized, in medicine. See *CONCHA Veneris*, and *COWRY*.

The name *concha venerea* may be apt to create confusion, because there is another shell of a very different kind, a bivalve, called *concha veneris*. This genus is therefore much better distinguished by the name *porcellana*. There is a prodigious difference among the species of this genus: some are heavy, others very light; some have the mouth placed in a longitudinal, others in a transverse direction. The gibbous porcelain is a very remarkable species, as is also the egg-porcelain, which has two buttons at the extremities; and the egg-porcelain called the *navel* is not less remarkable than these: this has, instead of a button, a long beak at each end.

The mouth of the porcelain must be narrow and oblong; this is the great characteristic, and is usually dentated either on both sides or on one.

The species of porcelain are so numerous, that it may be proper, in the enumeration of them, to arrange them under some regular heads.

Some porcelains are conglobated, and thick; of these the cabinets of the curious afford us sixteen species.

Some, again, are thick and of a pyriform figure; of these we have twenty-one; and others are gibbous, of which we have five species. Hist. Nat. Eclairc. p. 308. See *CONCHOLOGY*.

PORCELIA, in *Botany*, Prodr. Fl. Peruv. 84. Pursh 383, is the same genus with *ORCHIDOCARPUM*; see that article. Mr. Pursh gives the following characters.

Calyx of three leaves. Petals six; the innermost largest. Stigmas sessile, obtuse. Berries several; often by abortion nearly solitary, ovate-kidney-shaped. Seeds several, tunicated, attached to the inner future.

Four species, all shrubs or small trees, are natives of North America, flowering in spring.

PORCELLANA, a species of the *Voluta*; which see. —Also, a species of the *Patella*; which see.

PORCELLANITE, in *Mineralogy*. See *JASPER*.

PORCELLIO, PIETRO, in *Biography*, a writer of poetry and history in the 15th century, was a native of Naples, of the family of Pandoni. In after life he resided chiefly at Rome, where he taught a Latin school. In 1434 he was thrown into prison by order of pope Eugenius IV. Probably he had taken a part in the tumults which drove that pontiff from Rome. When he was released, he passed some time in exile. He then became secretary to Alfonso, king of Naples, by whose order he joined the Venetian army engaged against Francesco Sforza for the avowed purpose of becoming the historiographer of that war. He was, after this, employed in other official situations, but was never able to rise to any degree of affluence.

fluence. The time of his death is not known, but it is supposed to have taken place during the pontificate of Paul II. He was regarded as one of the most eminent Latin poets of his time. His style in prose is better than in verse. Some of his Latin poems have been printed in collections, and his history of the war, of which he was a witness, was published by Muratori.

PORCELLIONES, in the *Materia Medica*, a name given by some to the millepedes.

PORCELLO, in the *Glass Trade*, the instrument with which the workman, after having made the opening for the bowl of a drinking glass or other such vessel with his passage, widens and renders it more capacious at pleasure.

PORCELLUS CASSOVIENSIS, in *Medicine*, the name of a disease to which the people of Hungary and Poland are very subject.

It is a hard tumour of the belly, attended with a wind and violent pains. It is truly an infarction of the spleen, and is to be cured by aperitives. Philof. Tranfact. N^o 243.

PORCELLUS *Fruentarius*, in *Zoology*. See *MUS Cricetus*.

PORCELLUS *Indicus*, a name given by authors to the animal called with us the guinea pig. See *CAVIA Cobaya*.

PORC-EPIC. See *HYSTRIX Cristata*.

PORCH; ATRIUM, a kind of vestibule, supported by columns, much used at the entrance of the ancient temples, halls, churches, &c.

In the ancient architecture, a porch was a vestibule, or a disposition of insulated columns, usually crowned with a pediment, forming a covert place before the principal door of a temple, or court of justice. Such is that before the door of St. Paul's, Covent-garden, the work of Inigo Jones.

When it had four columns in front, it was called a *tetrapstyle*; when six, *hexastyle*; when eight, *octostyle*; when ten, *decastyle*, &c. Vitruvius calls it *pronas*; Pollux, *περοδομος*, *prodomos*: when finer than ordinary, the ancients call it, *alio*, *propyleum*.

PORCHERON, DAVID-PLACIDE, in *Biography*, a learned Benedictine monk, born at Chateaux-roux, in Berri, in the year 1652, was librarian of the abbey of St. Germain-des-Près. He is celebrated for his profound erudition in the languages, history, geography, and genealogical and medallic researches. He died at the age of 42. He had a considerable share in a new edition of the works of St. Hilary, and other works edited by his fraternity; and he published an edition of the "Anonymous Geographer of Ravenna," with learned and curious notes: and an improved edition of "Maximes pour l'Education d'un jeune Seigneur," to which he subjoined a translation of the "Instructions of the Emperor Bazil, the Macedonian, to his son Leo," with the "Lives of both Emperors."

PORCHOV, in *Geography*, a town of Russia, in the government of Pskov; 60 miles E. of Pskov. N. lat. 57° 40'. E. long. 30° 14'.

PORCIA, in *Biography*, one of the most celebrated females of antiquity, was daughter of Cato of Utica. She was married to Bibulus, by whom she had two children. Becoming a widow, she was united in a second marriage to Marcus Brutus, who was her cousin. The events of the times called forth all the principles of fortitude which she had imbibed from her father and husband. When the latter engaged in a conspiracy against Cæsar, the agitation of mind under which he laboured could not be concealed from his wife, who did not venture to urge him to let her share in the secret, till she had given decisive proof of the strength of her mind. She accordingly gave herself a deep wound in her thigh, and then, when loss of blood and pain had confined her to the bed, she represented to him

that the daughter of Cato and *his* wife might hope to be considered as something more than a mere female companion: aware, however, of the weakness of her sex, she did not claim a participation in his secret anxieties, till she had made trial of her fortitude. She then shewed him her wound; upon which Brutus, having offered up a prayer that he might approve himself worthy of such a wife, informed her of the conspiracy. In her breast the secret was secure, yet when the important day arrived, she was unable to conceal the agitation of her mind, but sent messenger after messenger to bring her word what Brutus was doing, and at length fainted away, so that a report reached her husband that she was dead. After the death of Brutus, Porcia declared a resolution not to survive him, but being closely watched by her friends to prevent her from executing her purposes, she snatched burning embers from the fire, and thrusting them into her mouth was suffocated. This was the current account, but Plutarch, who speaks on good authority, says, that the neglect of her friends was the cause of her refusing to live. Plutarch. Univer. Hist.

PORCIA, in *Geography*, a town of Italy, in Friuli; 16 miles N.N.W. of Concordia.

PORCINA, a town of Naples, in the province of Capitanata; 8 miles N.E. of St. Severo.

PORCINE DEER, in *Zoology*. See *CERVUS Porcinus*.

PORCO, in *Geography*, a jurisdiction of La Plata, in South America, enclosing the district of Potosi, beginning at the west side of the town of Potosi, and at the distance of about 25 leagues from the city of Plata, and extending about 20 leagues farther. The coldness of its situation occasions a scarcity of grain and fruits, but it abounds in fine cattle, and particularly in sheep and vicunas. In this situation is the mountain of Porco, which gives it its name, and from the mines of which the Incas extracted all the silver for their ornaments and expenditure; and accordingly it was the first mine wrought by the Spaniards after the conquest. The capital of the above jurisdiction is of the same name. S. lat. 19° 40'. W. long. 67° 56'.

PORCO, in *Ichthyology*, a name by which some authors have called the fish more usually known by the name of *capripræus*, supposed to be the porcus of Pliny. See *GOAT-fish*.

PORCOS, in *Geography*, a small island in the Atlantic, near the coast of Brasil. S. lat. 23° 30'.

PORCUNA, a town of Spain, in the province of Jaen; 8 miles S.S.W. of Andujar.

PORCUPINE, in *Zoology*. See *HYSTRIX*.

PORCUPINE-FISH, in *Ichthyology*. See *DIODON Hystrix*.

PORCUPINE RIVER, in *Geography*, a river of America, which runs into lake Superior, N. lat. 46° 14'. W. long. 87° 36'.

PORCUS ACULEATUS, in *Zoology*. See *ERINACEUS Malaccensis*, and also *HYSTRIX Macroura*.

PORCUS of Pliny, &c. &c. See *SUS*.

PORCUS *Marinus*. See *DELPHINUS Delphis*.

PORCUS, in *Ichthyology*, a species of *Scorpena*; which see.

PORCUS *Fluviatilis*, a name given by the old Latin authors to the fish we at this time call the *cernua* and *aurata*, and in English the *ruffe*. See *PERCA Cernua*.

PORCZOW, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 60 miles W.S.W. of Novogrodek.

PORDEN, a town of Prussia, in Ermeland; 11 miles S. of Allenstein.

PORDENACK POINT, a cape on the S.W. coast of England; two miles S. from the Land's End.

PORDENONE, IL, in *Biography*, the cognomen of a painter

painter of great merit, whose real name was Giovanni Antonio Licino, and who afterwards adopted that of Regillo. He was born at Pordenone, in Friuli, in 1484. It is not certain that he frequented the school of Giorgione, but he resembles him more in grandeur of mind, vigour of conception, and manner, than any of his scholars, Titian excepted, whom he frequently rivalled with no light degree of success. His works in oil are of a very superior brilliancy and richness, but his great excellence was in fresco. The most considerable picture which Rome possessed of him is that with the portraits of his family in the palace Borgheze; but his most splendid work in oil is the altar piece of Santa Maria del Orto, at Venice, which represents a St. Lorenzo, surrounded by other saints, among whom a St. John Baptist surprises no less by correctness of forms, than a St. Augustin by a boldness of fore-shortening, which makes his arm start from the canvas.

The frescoes of Pordenone are spread over the towns and castles of Friuli: some are found at Mantua, Genoa, and Venice; but the best preserved ones are at Piacenza and Cremona. In these he is not always equal, but all bear marks of innate vigour and bold conception: of a mind as eager to form as to resolve difficulties in variety of expression, singularity of perspective, novelty of fore-shortening, and magic resources of chiaro-scuro. Highly valued and ennobled by the emperor Charles V., Pordenone was called to Mantua by Ercole II., where he soon after died at the age of 56; not without suspicion of being poisoned. He had an imitator in Bernardino Licinio, who from the name may be supposed to have been related to him; and Sandrart mentions in high strains of praise Giulio Licinio da Pordenone as his nephew and scholar; who, according to that author, quitted Venice, and left frescoes of extraordinary beauty at Augsbourgh. Fufeli.

PORDENONE, in *Geography*, a town of Italy, in Friuli, on the Noncello; 26 miles W.S.W. of Udina. N. lat. 45° 50'. E. long. 12° 39'.

PORDOSELENA, in *Ancient Geography*, an island situated between the isle of Lesbos and the continent of Myfia; called Porofolene by Strabo and Pliny.

PORE, formed from *προς*, aperture, or *duē*, a little interstice between the particles of matter which constitute bodies either empty, or filled with some insensible medium.

Condensation and rarefaction are only performed by closing and opening the pores.

The transparency of bodies is usually supposed to arise from their pores being directly opposite to one another.

The matter of insensible perspiration is conveyed through the pores of the cutis.

Sir Isaac Newton shews, that bodies are much more rare and porous than is commonly believed: water, *e. gr.* is nineteen times lighter, and consequently rarer, than gold; and gold itself is so rare, as very readily, and without the least opposition, to transmit magnetic effluvia, and easily to admit quicksilver into its pores, and to let even water pass through it: for a concave sphere of gold hath, when filled with water, and foldered up, upon pressing with a great force, let the water squeeze through it, and stand all over its outside, in multitudes of small drops like dew, without bursting or cracking the gold. See COMPRESSION.

Whence it may be concluded, that gold has more pores than solid parts; and by consequence, that water hath above forty times more pores than parts.

The magnet transmits its virtues, without any diminution or alteration, through all cold bodies that are not magnetic; as gold, silver, brass, glass, water, &c. See MAGNETISM.

The rays of light, let them be either bodies actually coming to us from the sun, or only motions or impressions upon the medium, move in right lines, and are hardly ever, unless by great chance, reflected back again in the same line, after their impingence upon objects; and yet we see, that light is transmitted to the greatest distances through pellucid bodies, and that in right lines.

Now how bodies should have pores sufficient for these effects, may be difficult to conceive, but not impossible: for Sir Isaac shews, that the colours of all bodies arise from their particles being of such a determinate size, or magnitude. Wherefore, if we conceive those particles to be so disposed, as that there is as much porosity as there is of matter; and, in like manner, those particles to be composed of others much less, and that have as much interspersed vacuity, or space, as their quantity of matter amounts to; and so on, till we come to solid particles without pores: then, if in any body there be, for instance, three of these sizes of particles, and that the last be of the solid, or least sort; that body will have seven times as much vacuity as solid matter; if four such degrees, and the last be least, and solid, that body will have fifteen times as much porosity as solidity; if five such degrees, it will have thirty-one times as much space as solidity; and if six degrees, then it will have sixty-three times as much vacuity as solid matter.

And perhaps, in the wonderful conformation and fabric of natural bodies, there may be other proportions of space to matter, which are to us wholly unknown; whence it is possible there may be yet farther great quantities of interspersed vacuity.

PORES, in *Anatomy*, are certain permeable spaces, between the parts of the skin; by which we sweat, or perspire, &c.

The pores are most remarkable in the hands and feet. By viewing the palm of the hand with a moderate glass, after washing it well, we perceive innumerable little ridges, of equal size and distance, running parallel to each other, especially on the tips and joints of the fingers, &c. where they are regularly disposed into spherical triangles, and ellipses.

On these ridges stand the pores, in even rows, big enough to be seen by a good eye without a glass; but with one, every pore looks like a little fountain; and the sweat may be seen to stand in it, clear as rock water; and as often as it is wiped off, it springs up again.

The pores are placed on the ridges, not in the furrows between them; that they might be less liable to be stopped by compression: for the same reason, the pores of the hands and feet are larger than the rest; those parts being more used and pressed than the rest; and hence, again, there are no ridges on other parts.

These pores serve as a convenient outlet for the more noxious parts of the blood, which, by the continual use of the hands and feet, are plentifully brought into them: whence, in hypochondriac and hysteric people, there is a continual burning in the palms and soles. See INTEGUMENTS and SKIN.

In the stoppage or constriction of the pores of the skin, that disease which we popularly call a *cold*, is commonly supposed to consist; though Dr. Keill maintains a quite contrary opinion in a dissertation at the end of his "*Medicina Statica Britannica*."

In the Philosophical Transactions we have an instance of a student near Leyden much addicted to astronomy, who spending many nights in star-gazing, had, by the nocturnal wet and cold, so obstructed the pores of his skin, that little or nothing exhaled from his body: as appeared hence, that the shirt he had worn five or six weeks was then as white as if

if it had only been worn one day. In the mean while, a water was collected under the skin, of which he was afterwards cured.

PORE, *Biliary*. See BILIARI Pori, and PORI *Biliary*.

POREY, CHARLES, in *Biography*, a distinguished professor of rhetoric, was born in 1675, at Vendées, near Caen. He was early entered into the society of Jesuits, and became a teacher of the languages in the province, by which he gained a high reputation. Being summoned to Paris for his theological studies in 1708, he was soon nominated to the chair of rhetoric in the college of Louis le Grand. He accepted the post with regret, because it took him off from the great object which he had in view; viz. of consecrating his life to missions among infidels. As a teacher, it is said no one ever fulfilled the duties with more zeal, industry, and success; he had the talent of making himself beloved by his pupils, and of guiding them by gentleness, and the force of his own example. He so entirely devoted himself to the business of his professorship, that he lived almost as a solitary in the midst of Paris. His labours were continued thirty-three years, during which he formed many pupils that did honour to the instructions of their master, and he died in general esteem in 1741, at the age of sixty-six. His writings are numerous, chiefly in the Latin language, his style being formed rather upon that of Seneca than of Cicero. His principal works are two "Collections of Harangues," published in 1735 and 1747; also six Latin tragedies and five Latin comedies. He was also author of several fugitive pieces in prose and verse. He had a brother, Charles Gabriel, who died in 1770, at the age of 85, a considerable writer, but known principally for a work entitled "Nouvelles Littéraires de Caen," in 3 vols. 8vo., being a collection of pieces in prose and verse, written by the academicians of that city, and also for "Forty-four Dissertations on different Subjects," read before the academy of Caen, of which he was a member more than thirty years.

POREITCH, in *Geography*, a town of Russia, in the government of Smolensk; 28 miles N.W. of Smolensk. N. lat. 55° 5'. E. long. 26° 40'.

PORELLA, in *Botany*, from a number of pores in the supposed seed-vessel, Dill. Musc. 459. t. 68, adopted by Linnæus and others as a distinct genus of *Musci*, is proved by Mr. Dickson, Tr. of Linn. Soc. v. 3. 238. t. 20, to be a *Jungermannia*, whose sheath had been accidentally perforated in various directions, and mistaken for a capsule. This accurate observer therefore calls the plant *Jungermannia Porella*. It comes from Pennsylvania, and belongs to that tribe of the genus which has two-ranked auricled leaves, an inflated sheath, and very short fruit-stalk. Loureiro nevertheless has a *Porella*, Cochinch. 683, to which he gives the specific name of *imbricata*, with the following characters,

Gen. Ch. Anther (rather, as we presume, Capsule) of many cells, perforated, without operculum or veil.

Sp. Ch. Leaves lanceolate, imbricated in five rows.—Native of moist places in Cochinchina. Stem erect, branched, three inches high. Leaves linear inclining to lanceolate, curved, undulated, whitish. Anther (Capsule?) ovate, porous, naked, sessile, of many cells. We do not pretend to determine the genus of this plant, which, if really distinct, should retain the old name of *Porella*, while it replaces that now abolished genus. It seems to belong to the same order as *Lycopodium*, and possibly may be a species of that genus, not accurately understood.

PORENTROY, in *Geography*. See PORRENTROY.

PORFILIGON, a word used by some of the chemical

writers to express the *squamæ martis*, or the scales of iron which fly off in the smith's hammering of it.

PORI, in *Geography*, a small island near the north coast of Sardinia. N. lat. 41° 12'. E. long. 9° 35'.—Also, a small island in the Mediterranean; 20 miles S.S.E. of Cerrigo.

PORI *Biliary*, in *Anatomy*, the small branches of the biliary ducts in the liver. See LIVER.

PORIME, PORIMA, in *Geometry*, a theorem or proposition, so easily demonstrated, that it is almost self-evident.

The word is formed from the Greek ποριμος, *pervious*, a thing easy to penetrate or conceive, and which opens the way to something more difficult.

Such, e. gr. is this; that a chord is wholly within the circle.

Porime stands opposed to *aporime*, which denotes a proposition so difficult, as to be almost impossible to be demonstrated: such as the quadrature of the circle is now, and as the squaring of any assigned portion of Hippocrates's lunes formerly was.

The porime coincides nearly with the lemma, or assumption.

PORISM, a proposition partaking both of the nature of a problem and a theorem, but is strictly neither the one nor the other, but of an intermediate kind between the two.

Euclid wrote three books of porisms, which are, however, lost; and nothing remains of them, in the works of any of the ancient geometricians, besides what Pappus has preserved in a very obscure and imperfect state, in his Mathematical Collections, in the introduction to his seventh book. He there states the following definitions of a theorem, a problem, and a porism: "Differentias autem horum trium, melius interlexisse veteres manifestum est ex definitionibus. Dixerunt enim *theorema* esse quo aliquid proponitur demonstrandum. *Problema* quo proponitur aliquid construendum. *Porism* vero esse quo aliquid proponitur investigatum." Pappus also mentions another definition of a porism, given by those mathematicians which were accounted modern in his time, but which he censures as incomplete; viz. "quod deficit hypothesi a theoremate locali;" which clearly implies that a porism had an immediate reference to a *locus*; though it is not less clear that Pappus considered loci as only one class of porisms, and that in fact there are many porisms that have no connection whatever with loci.

It has, however, been justly observed, that while this definition was censured by Pappus as not sufficiently general, because it includes a number of porisms unconnected with loci, the one he has given, as more characteristic of porisms, is as much too general, because though it does correspond to the nature of these propositions, it is deficient in discrimination, and of itself neither conveys any precise idea of Euclid's porisms, nor gives assistance in the investigation of any individual proposition. It appears, therefore, that between the time of Euclid and Pappus the correct idea of porisms had been lost, and consequently it became a very difficult task for the moderns to recover this intricate part of the ancient geometry; and it is, therefore, not astonishing that many who have attempted this task have completely failed, while the success of others is sometimes very doubtful.

Albert Girard, a geometer of eminence in the early part of the 17th century, was the first who announced the restoration of the porisms of Euclid in his Trigonometry, published in 1629; and also in his addition of Stevinus in 1634, he states his having restored the porisms of Euclid, but in such general terms, that no precise opinion can thence be formed of his notions on the subject: and indeed it seems to be the opinion

opinion of Simson, that Girard had deceived himself with regard to the nature of the porisms of the ancients. Bullialdus is the next author who mentions them, in one of his *Exercitationes Geometricæ* (1657); but in it he refers to Fermat as the inventor, who had communicated the discovery in letters to some of his friends at Paris. Fermat, therefore, may be considered as the first among the moderns who made any near approach to the discovery of the ancient porisms. He supposed even that he had made such progress, as to ensure a complete restoration of Euclid's work; but the five propositions he has given as a specimen of his invention, though undoubtedly porisms, are no part of Euclid's treatise, which, with other circumstances connected with them, have made it a question whether or not this celebrated author had acquired a correct idea of these propositions, though he had certainly made an important step towards it.

Passing over the attempts of some other mathematicians, we come immediately to Dr. Simson, who is certainly the first whose endeavours were crowned with complete success. This celebrated geometrician had at an early part of his life considered this subject, and after many fruitless endeavours, had laid it by for a considerable time; but afterwards upon reconsidering it, he fell upon a complete and satisfactory illustration of these propositions. His first paper on this subject was published in the *Philosophical Transactions*, vol. xxxii.; besides which, he left at his death a considerable treatise on porisms, which was published in his "*Opera Reliqua*," in 1776. Simson there defines a porism as follows: "Porisma est propositio in qua proponitur demonstrare rem aliquam, vel plures datas esse, cui, vel quibus, ut et cuilibet ex rebus innumeris, non equidem datis, sed quæ ad ea quæ sunt eandem habent relationem, convenire ostendendum est affectionem quandam communem in propositione descriptam;" which Mr. Lawson has rendered into English thus: "A porism is a proposition, in which it is proposed to demonstrate that some one thing, or more things, are given, to which, as also to each of innumerable other things, not indeed given, but which have the same relation to those that are given, it is to be shewn that there belongs some common affection described in the proposition." This, which is intended to be a literal translation of the above, is subject to some obscurity; in order to obviate which, Playfair, without regarding the exact literal translation, has rendered it as follows: "A porism is a proposition, in which it is proposed to demonstrate that one or more things are given, between which and every one of innumerable other things, not given, but assumed according to a given law, a certain relation, described in the proposition, is to be shewn to take place." The professor, however, does not himself adopt this definition, but, after a learned and very ingenious chain of argument, draws this conclusion, that "a *porism* is a proposition, affirming the possibility of finding such conditions, as will render a certain problem indeterminate, or capable of innumerable solutions." This definition is given by Playfair in vol. iii. of the *Edinburgh Transactions*, in a paper highly interesting to mathematicians, both on account of its reference to the subject of this article, and the many curious and important observations which it contains on the geometry of the ancients in general. He here, after enumerating the various attempts that have been made by modern mathematicians to restore some of the lost works of the ancients, and particularly Dr. Simson's successful illustration of Euclid's porisms, observes: "The subject of porisms is not, however, exhausted, nor is it yet placed in so clear a light as to need no farther illustration. It still remains to inquire into the probable origin of these propositions; that is to say, into the

steps by which the ancient geometers appear to have been led to the discovery of them.

"It remains also to point out the relation in which they stand to other geometrical truths; to consider the species of analysis, whether geometrical or algebraical, that belongs to them; and, if possible, the reason why they have escaped so long the notice of modern mathematicians. It is to these points that the following observations are chiefly directed."

He then proceeds to describe the steps which appear to have led the ancient geometers to the discovery of porisms; supplying, as he observes, the want of express testimony by probable reasonings.

It cannot be doubted, says our author, that it has been the solution of problems, which, in all states of the mathematical sciences, has led to the discovery of most geometrical truths. The first mathematical inquiries in particular must have occurred in the form of questions, where something was given, and something required to be done; and by the reasonings necessary to answer these questions, or to discover the relation between the things that were given and those required to be found, many truths were suggested, which came afterwards to be the subject of separate demonstrations. The number of these was the greater, because the ancient geometers always undertook the solution of problems with the most scrupulous and minute attention, which scarcely suffer any of the collateral truths to escape their observation. We know, from the examples they have left us, that they never considered a problem as resolved, till they had distinguished all its varieties, and evolved separately every different case that could occur, carefully remarking every change that might arise in the construction, from any change that was supposed to take place amongst the magnitudes which were given.

Now as this cautious manner of proceeding was not less calculated to avoid error, than lay hold of every truth that was connected with the main object of inquiry, these geometers soon observed that there were many problems, which, in certain circumstances, would admit of no solution whatever; and that the general construction by which they were resolved would fail, in consequence of a particular relation being supposed among the quantities which were given.

Such problems were then said to become impossible; and it was readily perceived that this always happened, when one of the conditions prescribed was inconsistent with the rest, so that the supposition of their being united in the same subject involved a contradiction. Thus, when it was required to divide a given line, so that the rectangle under its segments should be equal to a given space, it was evident that if this space was greater than the square of half the given line, the thing required could not possibly be done; the two conditions, the one defining the magnitude of the line, and the other that of the rectangle under its segments, being then inconsistent with one another. Hence an infinity of beautiful propositions concerning the maxima and minima of quantities, or the limits of the possible relations, which quantities may stand in to one another.

Such cases as these would occur even in the solution of the simplest problems; but when geometers proceeded to the analysis of those that were more complicated, they must have remarked their constructions would sometimes fail, for a reason directly contrary to that which has now been assigned. Instances would be found where the lines, that by their intersection were to determine the theory sought, instead of intersecting one another, as they did in general, or of not meeting at all, as in the above-mentioned case of im-

possibility, would coincide with one another entirely, and leave the question of consequence unresolved.

But though this circumstance must have created considerable embarrassment to the geometers who first observed it, as being perhaps the only instance in which the language of their own science had yet appeared to them ambiguous or obscure, it would not probably be long before they discovered the true interpretation to be put upon it. After a little reflection, they would conclude, that since, in the general problem, the magnitude required was determined by the intersection of the two lines above mentioned, that is, by the points common to them both; so, in the case of their coincidence, as all their points were in common, every one of these points must afford a solution; which solution, therefore, must be infinite in number; and also, though infinite in number, they must all be related to each other, and to the things given, by certain laws, which the position of the two coinciding lines must necessarily determine.

On enquiring farther into the peculiarity in the state of the data which had produced this unexpected result, it might likewise be remarked, that the whole proceeded from one of the conditions of the problem involving another, or necessarily including it; so that they both together make in fact but one, and did not leave a sufficient number of independent conditions to confine the problem to a single solution, or to any determinate number of solutions. And it was not difficult afterwards to perceive, that these cases of the problem formed very curious propositions, of an intermediate nature between problems and theorems, and that they admitted of a separate enunciation peculiarly elegant and concise; and to such propositions thus enunciated the ancient geometers gave the name of porisms.

In order to illustrate this deduction, our author proposes several problems, one of which we shall transcribe, in order to shew the method of investigation.

A triangle ABC (*fig. 12. Plate XI. Geometry,*) being given, and also a point D , to draw through D a straight line DG , such that perpendiculars being drawn to it from the three angles of the triangle, *viz.* AE , BG , CF , the sum of the two perpendiculars on the same side of DG shall be equal to the remaining perpendicular; or that AE and BG together, may be equal to CF .

Suppose it done, bisect AB in H , join CH , and draw HK perpendicular to DG .

Because AB is bisected in H , the two perpendiculars, AE and BG , are together double HK , and as they are also equal to CF , by hypothesis CF must be double of HK ; and CL of LH . Now GH is given in position, and magnitude; therefore the point L is given; and the point D being also given, the line DL is given in position; which was to be found. The construction is obvious. Bisect AB in H , join CH , and take HL equal to one-third of CH ; the straight line which joins the points D and L is the line required.

Now it is evident, that while the triangle ABC remains the same, wherever the point D may be, the point L will also remain the same. The point D may, therefore, coincide with L ; and when this happens, the position of the line to be drawn is left undetermined; that is to say, any line whatever drawn through L will satisfy the conditions of the problem. Here, therefore, we have another indefinite case of a problem, and of consequence another porism, which may be thus enunciated. "A triangle being given in position, a point in it may be found, such that any straight line whatever being drawn through that point, the perpendicular drawn to this straight line from the two angles of the triangle, which are on one side of it, will be together equal

to the perpendicular that is drawn from the same line from the angle on the other side of it."

This porism may be made more general; for if, instead of the angles of a triangle, we suppose ever so many points to be given in a plane, a point may be found such, that any straight line being drawn through it, the sum of all the perpendiculars that fall on that line from the given points on one side of it, is equal to the sum of the perpendiculars that fall on it from all the points on the other side of it. Or, still more generally, any number of points being given not in the same plane, a point may be found, through which if any plane be supposed to pass, the sum of all the perpendiculars which fall on that plane from the points on the one side of it, is equal to the sum of all the perpendiculars that fall on the same plane from the points on the other side of it. It is unnecessary to observe, that the point to be found in these propositions is no other than the centre of gravity of the given points; and that, therefore, we have here an example of a porism very well known to the ancient geometers, though not distinguished by them from other theorems.

Our author then proceeds to a farther illustration by other examples and remarks, from which he ultimately arrives at the conclusion, which furnishes him with the definition given above, *viz.* a porism is a proposition, affirming the possibility of finding such conditions as will render a certain problem indeterminate, or capable of innumerable solutions.

To this definition, he observes, the different characters that Pappus has given will apply without difficulty. The propositions described in it, like those which he mentions, are, strictly speaking, neither theorems nor problems, but of an intermediate nature between both; for they neither simply enunciate a truth to be demonstrated, nor propose a question to be solved; but are affirmations of a truth, in which the determination of an unknown quantity is involved. In as far, therefore, as they assert, that a certain problem may become indeterminate, they are of the nature of theorems; and in as far as they seek to discover the conditions by which that is brought about, they are of the nature of problems.

In this definition also, and the instance from which it is deduced, we may trace that imperfect description of porisms which Pappus ascribes to the latter geometers, but which he censures as deficient, *viz.* "Porisma est quod deficit hypothesei a theoremate locali." Now to understand this, it must be observed, that if we take the converse of one of the propositions called *loci*, and make the construction of the figure a part of the hypothesis, we have what was called by the ancients a *local theorem*. And again, if in enunciating this theorem, that part of the hypothesis which contains the construction be suppressed, the proposition thence arising will be a *porism*; for it will enunciate a truth, and will also require, to the full understanding and investigation of that truth, that something should be found, *viz.* the circumstance in the construction supposed omitted.

Thus, when we say, if from two given points E and D , (*fig. 13.*) two lines, EF and FD , are inflected to a third point F , so as to be to one another in a given ratio, the point F is in the circumference of a circle given in position; we have a locus.

But when it is said conversely; if a circle ABC , of which the centre is O , is given in position, as also a point E ; and if D be taken in the line EO , so that the rectangles EO , OD , be equal to the square of AO , the radius of the circle; and if from E and D the right lines EF and DF be inflected to any point whatever in the circumference ABC ; the ratio of EF to DF will be a given ratio, and

and the same with that of $E A$ to $A D$; we have a local theorem.

And, lastly, when it is said, if a circle $A B C$ be given in position, and also a point E , a point D may be found, such, that if the two lines $E F$ and $F D$ be inflected from E and D to any point whatever, F , in the circumference, these lines shall have a given ratio to one another; the proposition becomes a porism. Here it is evident, that the local theorem is changed into a porism, by leaving out what relates to the determination of the point D , and of the given ratio. But though all propositions formed in this way, from the conversion of *loci* be porisms, yet all porisms are not formed from the conversion of loci; and, therefore, the definition which defines all porisms as being so convertible is not sufficiently comprehensive. Fermat's idea of porisms was founded wholly on this definition, and therefore could not fail to be imperfect.

Hence it follows, that the definition of porisms given above agrees with Pappus's idea of these propositions, as far at least as can be collected from the imperfect fragments which contain his general description of them; and it agrees also with that of Dr. Simson, as stated in the former part of this article, *viz.* "Porisma est propositio in qua proponitur demonstrare rem aliquam, vel plures datas esse, cui, vel quibus, ut et cuilibet ex rebus innumeris non equidem datis, sed quæ ad ea quæ data sunt eandem habent relationem, convenire ostendendum est affectionem quandam communem in propositione descriptam."

It is here that there is a considerable degree of obscurity in this definition; notwithstanding which it is certain, that every proposition to which it applies must contain a *problematical* part, *viz.* "in qua proponitur demonstrare rem aliquam, vel plures datas esse;" and also a *theoretical* part, which contains the property or communis affectio, affirmed of certain things that have been previously described.

It is also evident, that the subject of every such proposition, is the relation between magnitudes of three different kinds; determinate magnitudes, which are to be found, and indeterminate magnitudes, which, though unlimited in number, are connected with the others by some common property, which are exactly the conditions contained in the definitions that have been given above.

In an enquiry into the origin of porisms, the etymology ought not to be forgotten. The question indeed is not about the derivation of the word *πορισμα*, for on that head there is no doubt, but about the reason why this term was applied to the class of propositions above described. Two opinions may be formed on this subject, and both of them with considerable probability. One of the significations of *πορίζω*, is to *acquire* or *obtain*, and hence *πορισμα* the thing *obtained* or *gained*.

Accordingly Scapula says, "Est vox a geometris desumpta qui theoremata, aliquid ex demonstrativo syllogismo necessario sequens inferentes illud quasi lucrari dicuntur, quod non ex professio quidem theorematis, hujus instituta sit demonstratio, sed tamen ex demonstratis recte sequatur." In this sense Euclid uses the word in his Elements of Geometry, where he calls the corollaries of his propositions, *porismata*. This circumstance creates a presumption, that when the word was applied to a particular class of propositions, it was meant, in both cases, to convey nearly the same idea, as it is not at all probable, that so correct a writer as Euclid, and so scrupulous as he was in his use of words, should use the same word to convey two ideas, which are so perfectly different. May we not, therefore, conjecture that these propositions got the name of porisms entirely with a reference to their origin.

According to the idea explained above, they would generally occur to mathematicians, when engaged in the solution of the most difficult problems, and would arise from those particular cases, where one of the conditions of the data involved in it some one of the rest. Thus a particular kind of theorem would be obtained, following as a corollary from the solution of the problem: and to this theorem the term *πορισμα* might be very properly applied, since, in the words of Scapula above-mentioned, "non ex professio theorematis hujus instituta sit demonstratio, sed tamen ex demonstratis recte sequatur."

But though this interpretation agree so well with the supposed origin of porisms, it is not free from difficulty. The verb *πορίζω* has another signification, *to find out*, *to discover*, *to devise*, and is used in this sense by Pappus, when he says, that the propositions called porisms afford great delights, *τοις δυναμοις οραν και ποριζμα*, to those who are able to understand and investigate. Hence comes *πορισμος*, the act of *finding out* or *discovering*; and from *πορισμος*, in this sense, the same author evidently considers *πορισμα* as being derived. His words are; *Εφασαν δε (οι αρχαιαι) πορισμα ενωπιον προτεινομενον εις πορισμον αυτη προτεινομενου*, *the ancients said a porism is something proposed for the finding or discovering of the very thing proposed*. It seems singular, however, that porisms should have taken their name from a circumstance common to them with so many other geometrical truths; and if this was really the case, it must have been on account of the enigmatical form of their enunciations, which required, that in the analysis of these propositions a sort of double discovery should be made, not only of the truth, but also of the meaning of the very thing that was proposed. They may, therefore, have been called *porismata*, or investigations, by way of eminence.

We might next proceed to consider the particular porisms which Dr. Simson has restored, and to shew that every one of them is the indeterminate case of some problem. But of this it is so easy for any one, who has attended to the preceding remarks, to satisfy himself by barely examining the enunciations of those propositions, that the detail into which it would lead seems to be unnecessary. We shall, therefore, go on to make some observations on that kind of analysis which is particularly adapted to the investigation of porisms.

If the idea we have given of these propositions be just, it follows, that they are always to be discovered by considering the cases in which the construction of a problem fails in consequence of the lines, which by their intersection, or the points which by their position were to determine the magnitude required, happening to coincide with one another. A porism, therefore, may be deduced from the problem it belongs to, in the same manner that the propositions concerning the maxima and minima are deduced from the problems of which they form the limitations; and such, no doubt, is the most obvious and most natural analysis of which this class of propositions will admit.

It is not, however, the only one that they will admit of, and there are good reasons for wishing to be provided with another, by means of which a porism that is any how suspected to exist may be found out, independently of the general solution of the problem to which it belongs. Of these reasons one is, that the porism may perhaps admit of being investigated, more easily than the general problem admits of being resolved; and another is, that the former, in almost every case, helps to discover the simplest and most elegant solution that can be given of the latter.

It is desirable to have a method of investigating porisms, which does not require that we should previously have re-

PORISM.

solved the problems they are connected with, and which may always serve to determine whether to any given problem there be attached a porism or not. Dr. Simson's analysis may be considered as answering to this description; for as that geometer did not regard these propositions at all in the light that is done here, nor in relation to their origin, an independent analysis of this kind was the only one that could occur to him; and he has accordingly given one which is extremely ingenious, and by no means easy to be invented, but which he uses with great skilfulness and dexterity throughout the whole of his Restoration.

It is not easy to ascertain whether this be the precise method used by the ancients. Dr. Simson had here nothing to direct him but his genius, and has the full merit of the first inventor. It seems probable, however, that there is at least a great affinity between the methods, since the *lemmata* given by Pappus as necessary to Euclid's demonstrations, are subservient also to those of our modern geometer.

It is, as we have seen, a general principle, that a problem is converted into a porism, when one or when two of the conditions of it necessarily involve in them some one of the rest: suppose, then, that two of the conditions are exactly in that state which determines the third; then while they remain fixed or given, should that third one be supposed to vary, or differ ever so little, from the state required by the other two, a contradiction will ensue. Therefore if, in the hypothesis of a problem, the conditions be so related to one another as to render it indeterminate, a porism is produced; but if, of the conditions thus related to one another, some one be supposed to vary, while the others continue the same, an absurdity follows, and the problem becomes impossible. *Wherever, therefore, any problem admits both of an indeterminate and an impossible case, it is certain that these cases are nearly related to one another, and that some of the conditions by which they are produced are common to both.*

It is supposed above, that two of the conditions of a problem involve in them a third, and wherever that happens, the conclusion which has been deduced will invariably take place. But a porism may sometimes be so simple, as to arise from mere coincidence of *one* condition of a problem with another, though in no case whatever any inconsistency whatever can take place between them. Thus, in the second of the foregoing propositions, the coincidence of the point given in the problem with another point, *viz.* the centre of gravity of the given triangle, renders the problem indeterminate; but as there is no relation of distance, or position, between these points that may not exist, so the problem has no impossible case belonging to it.

There are, however, comparatively but few porisms so simple in their origin as this, or that arise from problems, in which conditions are so little complicated; for it usually happens, that a problem which can become indefinite, may also become impossible; and if so, the connection between these cases, which has been already explained, never fails to take place.

Another species of impossibility may frequently arise, from the porismatic case of a problem, which will very much affect the application of geometry to astronomy, or any of the sciences of experiment or observation. For when a problem is to be resolved by help of data, furnished by experiment or observation, the first thing to be considered is, whether the data so obtained be sufficient for determining the thing sought; and in this a very erroneous judgment may be formed, if we rest satisfied with a general view of the subject. For though the problem may in general be resolved from the data that we are provided with, yet these data may be so related to one another in the case

before us, that the problem will become indeterminate, and instead of one solution will admit of an infinite number.

Suppose, for instance, that it were required to determine the position of a point, F, from knowing that it was situated in the circumference of a given circle ABC, and also from knowing the ratio of its distances from two given points E and D; it is certain that in general these data would be sufficient for determining the point F. But, nevertheless, if E and D should be so situated that they were in the same straight line with the centre of the given circle, and if the rectangle under their distances from the centre were also equal to the square of the radius of the circle, then the position of F could not be determined.

This particular instance may not indeed occur in any of the practical applications of geometry; but there is one of the same kind which has actually occurred in astronomy, and as the history of it is not a little singular, affording besides an excellent illustration of the nature of porisms, the detail of it will not be uninteresting to the reader. Sir Isaac Newton having demonstrated that the trajectory of a comet is a parabola, reduced the actual determination of the orbit of any particular comet to the solution of a geometrical problem, depending on the properties of the parabola; but of such considerable difficulty, that it was necessary to take the assistance of a more elementary problem, in order to find, at least nearly, the distance of the comet from the earth at the times when it was observed. The expedient for this purpose, suggested by Newton himself, was to consider a small part of the comet's path as rectilinear, and described with a uniform motion, so that four observations of the comet being made at moderate intervals of time from one another, four lines would be determined, *viz.* the four lines joining the earth and comet at the time of observation; across which, if a straight line were drawn so as to cut them in three parts, in the same ratio with the intervals of time above-mentioned, the line so drawn would nearly represent the comet's path, and by its intersection with the given lines, would determine, at least nearly, the distance of the comet from the earth at the times of observation.

The geometrical problem here employed, of drawing a line to be divided by four other lines given in position into parts having a given ratio to one another, had been already resolved by Dr. Wallis and Sir Christopher Wren, and to their solution Sir Isaac Newton added three others of his own, in different parts of his works; yet no one of these geometers observed that peculiarity in the problem which rendered it applicable to astronomy. This was first done by M. Boscovich, but not till after many trials, when, on its application to the motion of comets, it had never led to any satisfactory result. The errors it produced in some instances were so considerable, that Zanotii, seeking to determine by it the orbit of the comet of 1739, found that his construction threw the comet on the side of the sun, opposite to that on which he had actually observed it. This gave occasion to Boscovich, some years afterwards, to examine the different cases of the problem, and to remark, that in one of them it became indeterminate, and by a curious coincidence, this happened in the only case which could be supposed applicable to the astronomical problem above-mentioned. In other words, he found that in the state of the data, which must there always take place, innumerable lines might be drawn that would be all cut in the same ratio, by the four lines given in position. This he demonstrated in a dissertation published at Rome in 1749; and since that time in his *Opuscula*. A demonstration of it, by the same author, is also inserted at the end of Castillon's Commentary on Arithmetica

metica Universalis, where it is deduced from a construction of the general problem, given by Thomas Simpson, at the end of his Elements of Geometry. The proposition in Boscovich's words is this; "Problema quo quaeritur recta linea quae quatuor rectas positione datas ita secet, ut tria ejus segmenta sint invicem in ratione data, evadit aliquando indeterminatum, ita ut per quodvis punctum cujusvis ex iis quatuor rectis duci possit recta linea, quae ei conditioni faciat satis."

This proposition, our author observes, thus enunciated, is a porism, and that there is no doubt it was discovered by Boscovich in the same manner as we have supposed porisms to have been first discovered by the geometers of antiquity.

But a question nearly connected with the origin of porisms still remains to be solved, namely; from what cause has it arisen, that propositions which are in themselves so important, and that actually occupied so large a part of the ancient geometry, have been so little remarked in the modern? It cannot indeed be said, that propositions of this kind are wholly unknown to the moderns before the restitution of what Euclid had written concerning them. For before Boscovich's proposition, of which so much has been already said, the theorem which asserts, that in every system of points there is a centre of gravity, has been shewn above to be a porism, and we shall see hereafter, that many of the theorems in the higher geometry belong to the same class of propositions. We may add that some of the elementary propositions in geometry want only the proper form of enunciation to be perfect porisms. It is therefore not strictly true, that none of the class of propositions called porisms have been known to the moderns; but it is certain, that they have not met from them with the attention they met with from the ancients, and that they have not been distinguished as a separate class of propositions. The cause of this difference is undoubtedly to be sought for in a comparison of the methods employed for the solution of geometrical problems in ancient and modern times.

In the solution of problems, the geometers of antiquity proceeded with the utmost caution, and were careful to remark every particular case, that is to say, every change in the construction, which any change in the state of the data could produce. The different conditions from which the solutions were derived, were supposed to vary one by one, while the others remained the same, and all their possible combinations being thus enunciated, a separate solution was given wherever any considerable change was observed to have taken place. This was so much the case, that the *scitio rationis*, a geometrical proposition of no great difficulty, and one of which the solution would be dispatched, according to the methods of the modern geometry, in a single page, was made by Apollonius the subject of a treatise, consisting of two books. The first book has seven general divisions, and seventy-three cases, each of which cases is separately considered. Nothing, it is evident, that was any way connected with the problem, could escape a geometer who proceeded with such minuteness of investigation. The same scrupulous exactness may be remarked in all the other mathematical researches of the ancients; and the reason doubtless is, that the geometers of those ages, however expert they were in the use of their analysis, had not sufficient experience in its power, to trust to the more general applications of it. That principle which we call the *law of continuity*, and which connects the whole system of mathematical truths by a chain of insensible gradations, was scarcely known to them, and has been unfolded to us, only by a more extensive knowledge of the mathematical sciences, and by that most perfect mode of expressing the relations

of quantity, which forms the language of algebra; and it is this principle alone that has taught us, that though in the solution of a problem, it may be impossible to conduct the investigation, without assuming the data in a *particular* state, yet the result may be perfectly *general*, and will accommodate itself to every case with such a wonderful universality, as is scarcely credible to the most experienced mathematician, and such as often forces him to stop in the midst of his calculus, and look back with a mixture of diffidence and admiration on the unforeseen harmony of his conclusions. All this was unknown to the ancients, and therefore they had no resource, but to apply their analysis separately to each particular case, with that extreme caution which has just been described; and in so doing they were likely to remark many peculiarities, which more extensive views, and more expeditious methods of investigation, might perhaps have led them to overlook.

To rest satisfied, indeed, with too general results, and not to descend sufficiently into particular details, may be considered as a vice that naturally arises out of the excellence of the modern analysis. The effect which this has had, in concealing from us the class of propositions we are now considering, cannot be better illustrated than by the example of the porism discovered by Boscovich, in the manner related above. Though the problem from which that porism is derived was resolved by several mathematicians of the first eminence, among whom also was sir Isaac Newton, yet the porism, which, as it happens, is the most important case of it, was not observed by any of them. This is the more remarkable, that sir Isaac Newton takes notice of the two most simple cases, in which the problem evidently admits of innumerable solutions, *viz.* when the lines given in position are either all parallel, or all meeting in a point, and these two hypotheses he therefore expressly excepts. Yet he did not remark, that there are other circumstances, which may render the solution of the problem indeterminate as well as these; so that the porismatic case considered above escaped his observation; and if it escaped the observation of one who was accustomed to penetrate so far into matters infinitely more obscure, it was because he satisfied himself with a general construction, without pursuing it into its particular cases. Had the solution been conducted after the manner of Euclid or Apollonius, the porism in question must infallibly have been discovered. Edinburgh Phil. Transf. vol. iii. See also a paper on the same subject by H. Brougham, esq. Phil. Transactions for 1798, or New Abridgment, vol. xviii. p. 345—355.

PORISTIC METHOD, in *Mathematics*, is that which determines when, by what means, and how many different ways, a problem may be solved.

PORLAIT, or **PORLOYD**, in *Geography*, a river of North Wales, in the county of Caernarvon.

PORLARKSHOFEN, a bay on the S. coast of Iceland. N. lat. 64°. W. long. 17°.

PORLEZZO, a town of Italy, in the department of the Lario; 14 miles N. of Como.

PORLOCK, or **PORTLOCK**, a small sea-port, market town, and parish, in the hundred of Carhampton, and county of Somerset, England, is situated on the southern shore of the Bristol channel, at the distance of 167 miles W. by S. from London. The town was anciently a place of considerable note. In the time of the Saxon dynasty it was a royal vill, and was invested with many important privileges. It had then, and for many years posterior to the conquest, an extensive chace annexed to it, and also a free weekly market. Tradition even affirms, that it was a large and populous city, possessing all the splendour and magnificence

science of a royal metropolis; but this is a mere vulgar tale, and utterly undeserving of credit. That it was far more important, and better inhabited than any other sea-port town in the vicinity, however, is extremely probable, as extensive foundations of houses have been discovered here within the last century. Leland speaks of it as "a meatly good rode for shippes," but at present it is little frequented.

Porlock makes some figure in history during the Danish wars. In the year 918, a party of these marauders landed here under the conduct of earls Ohtor and Roald; but being soon discovered, they were attacked with such impetuosity by the inhabitants, that the greater part of them was cut off, and the remainder forced to re-embark with the utmost precipitation. In 1052, Harold, earl of Essex, who had been banished with his father, the earl of Kent, also landed at this place with a body of troops from Ireland, and met with the same firm resistance from the inhabitants as had been experienced by the Danes. The event of the contest, however, was different; for Harold not only obtained possession of the town, but advanced many miles into the country, spreading death and desolation every where around him. At length the approach of the royal forces compelled him to retrace his steps; but before re-embarking, he set fire to the town of Porlock and the adjacent woods, which were in consequence completely consumed.

At present Porlock consists only of two mean straggling streets, situated close to the church; which is an ancient structure in the English style of architecture, and contains several old tombs. Formerly a market was held here weekly, on Thursday, but there are now only three markets during the year, one at Michaelmas, which is the great market, and two in the spring, all for cattle. In the middle of the town stands an ancient market cross.

According to the parliamentary returns of 1811, Porlock parish comprises a population of 633 persons, inhabiting 140 houses. The scenery in this neighbourhood is highly picturesque and romantic. Steep and lofty hills, covered with wood, and intersected by deep vales, environ the town on every side except towards the sea, where the rocks rise with the boldest irregularity in many places, to the perpendicular height of three hundred feet. The whole of these rocks display numerous metallic veins and crystals of different kinds. In a wood, about a mile and a half from the town, are still seen the remains of an entrenchment, supposed to have been formed by Harold. Swords and other warlike instruments have been frequently dug up within the area. The History and Antiquities of the County of Somerset, by the Rev. John Collinson, F.S.A. 3 vols. 4to. 1791.

PORNASCE, a town of the Ligurian republic; 13 miles W.N.W. of Albenga.

PORNIC, a town of France, in the department of the Lower Loire, and chief place of a canton, in the district of Painbœuf, chiefly inhabited by fishermen; 11 miles S. of Painbœuf. The place contains 806, and the canton 6335 inhabitants, on a territory of 150 kilometres, in six communes.

PORO, a town of European Turkey, in Albania, near the river Vojussa; 12 miles N.E. of Valona.—Also, an island in the gulf of Engia, near the coast of Greece, anciently called "Calanrea;" 22 miles W. of Cape Colonna. N. lat. $37^{\circ} 31'$. E. long. $23^{\circ} 42'$.—Also, a small island among the Philippines, near the W. coast of Leyta. N. lat. $10^{\circ} 35'$. E. long. $124^{\circ} 20'$.

PORO Hotun, a town of Chinese Tartary; 108 miles N.E. of Peking. N. lat. $41^{\circ} 22'$. E. long. $117^{\circ} 14'$.

POROCELE, in *Surgery*, a hard tumour of the testicle.

POROG, in *Geography*, a town of Russia, in the government of Archangel; 20 miles S.E. of Oneg.—Also, a town of Austrian Poland, in Galicia; 28 miles S.S.W. of Halicz.

POROMASHIR. See PARAMOUSIR.

POROMPHALON, in *Surgery*, a hard tumour of the navel.

POROPHYLLUM, in *Botany*, so called from the pellucid dots, or pores, in the leaves. See CACALIA.

POROS, in *Geography*, an island in the Grecian archipelago, about 12 miles in circumference, near the E. coast of Greece, opposite to a bay called the "gulf of Poros." N. lat. $37^{\circ} 37'$. E. long. $23^{\circ} 30'$.

POROSLO, or BOROSLO, a town of Hungary, on the W. side of the Theyffe, in which is a magazine for salt; 18 miles S.E. of Erlau.

POROSTEMA, in *Botany*, from *πορος*, a pore, and *σημα*, a flamen, alluding to the origin of the stamens from the pores of the nectary.—Schreb. Gen. 517. Mart. Mill. Dict. v. 3. (Nectandra; Rolander MSS. Ocotea; Aubl. Guian. 780. Juss. 80.)—Class and order, *Polyadelphia Polyandria*. Nat. Ord. *Lauri*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, coloured, permanent, in six deep ovate obtuse segments; the three inner ones smallest. *Cor.* Petals none. Nectary of nine oblong abrupt scales, of which six are external, inserted into the base of the segments of the calyx, and lying upon them; and three internal, inserted into the receptacle, opposite to the others; each scale marked with four pores, the outer ones on the inside, the inner ones on the outside. There are also six roundish fleshy glands, inserted into the base of the calyx, between the two rows of scales. *Stam.* Filaments 36, each springing from a pore of the scales; anthers roundish, peltate, compressed. *Pist.* Germen ovate, angular, immersed in the receptacle; style short; stigma obtuse, concave. *Peric.* Capsule roundish, invested with the calyx, of from four to six cells. *Seeds* numerous, minute.

Eff. Ch. Calyx in six unequal segments. Petals none. Nectary of nine scales, each bearing four stamens. Capsule of several cells. *Seeds* numerous.

1. *P. guianensis*. (*Ocotea guianensis*; Aubl. t. 310.)—Native of most of the Guiana forests, flowering in April, and bearing fruit in June. The natives call this tree Ajouhou-ha. Its trunk is thirty feet high; the branches spreading. *Leaves* alternate, nearly sessile, lanceolate, pointed, entire, four or five inches long; smooth above; white and beautifully silky beneath. They are very remarkable for a plait or line, situated on each side of the nerve; but these are very differently placed, one being transverse near the base, and very short; the other longitudinal, not meeting with the nerve, though very long. The latter line has, in the dried plant, every appearance of having been caused by the hard pressure of some other leaf, which is however a deception. The specific name ought to have alluded to these very peculiar marks in the foliage. The flowers are small, fragrant, in axillary panicles. The leaves are employed as a cataplasm to ripen tumours or buboes.

POROSZOW, in *Geography*, a town of Lithuania, in the palatinate of Novogrodek; 10 miles S. of Wolkomyisk.

POROTICKS, in the *Materia Medica*, a term used by the ancients for such medicines as would consume calluses.

POROZ, in *Geography*, a river of Russia, in the government of Viatka, which runs into the Kama, near Kai.

PORPESE, in *Ichthyology*. See DELPHINUS *Phœnæna*.

To the brief account that has been given of the porpesse, under

under the article DELPHINUS, we shall give some farther particulars. This fish has no gills, nor any aperture in the place of them; but in the middle of the upper part of its head, before the brain, it has a pipe or spiracle, in form of a half moon, through which fishes of this sort draw in their breath, and spout out the water; this pipe terminates outwardly in one hole, but it is within divided into two parts by a bony septum, so as to represent two nostrils; but at its lower end it again becomes one hole, and opens into the mouth by a common orifice furnished with a very strong sphincter muscle, by means of which it may be shut and opened at pleasure; above this sphincter, the sides of the pipes are lined with a glandulous flesh, from which, when pressed, a glutinous liquor is forced out of certain little holes in it into the inside of the pipe; above the nostrils is a strong valve or membrane, which serves to stop the pipe at pleasure, and prevent any water from getting into it, but when the fish requires it within; within the fistula are six blind holes, having no outlet, four tending towards the snout, two placed above the valve, which stops the nostrils, and two beneath it; and two tending towards the brain, having a long and narrow cavity, which seems intended for the use of smelling, though, on opening the brain, no such olfactory nerves, or processus mamillares, as other animals are furnished with for this purpose, are to be found. The great contrivance of nature in the horizontal position of the tail in these fishes is, that it may supply the place of the hinder pair of belly-fins in other fish, those of the cetaceous kind having none such. These fins in other fish serve to balance the body, and keep it under water, and answer also in many respects to the hinder legs of a quadruped; and hence we see, that those fish which have long bodies, and have not this hinder pair of fins, nor the horizontal tail, cannot suspend themselves quietly in the water, but are forced to keep grovelling at the bottom. This is the case of eels, and all other fish of that kind: the use of respiration being as necessary to the porpessæ as to quadrupeds, and its wanting this pair of hinder fins, to poise or elevate itself with, nature has abundantly provided against the mischiefs that would attend that defect, by giving it this transverse tail, by a sudden jerk of which it can in a moment throw itself up to the surface from the deep water. The whale, and all the cetaceous fishes requiring the use of respiration, have also this manner of raising their unwieldy bodies allotted them by nature, instead of the hinder pair of fins, which must have been inconveniently large to be capable of this office. Its lungs and heart are like those of quadrupeds. The porpessæ has no gall-bladder, and thence authors have concluded that it has no gall; but this is too hasty a conclusion; for there is a duct which arises in the liver, and has a great many branches, and which, tending downwards, joins itself to the pancreatic duct; and these two, so united together, form a canal, or common duct, about four or five lines long, before they discharge their contents into the duodenum; from whence it appears that the porpessæ has always a discharge of bile into the duodenum, though it is thin and diluted, and such as, in other animals, is usually called *hepatic bile*. The brain is large, and resembles that of man; and probably it has been an observation of this that has given occasion to the opinion of this animal having so great a share of will and understanding, that has given rise to the story of Herodotus, that Arion was carried to shore on the back of one; and that of Pliny the elder, of one of these fish so fond of a certain boy, that he used to carry him daily from Baiæ to Puteoli, across the sea to school, and wait to carry him back again at a certain time. Pliny the younger gives us also a story of this kind in his epistles.

The blood of the porpessæ is as warm to the touch as that of quadrupeds, and the blubber, or fat, which lies in great quantity under the skin, covering the muscular flesh of the back and sides, is to keep up the natural heat, and prevent the cold of the sea water from chilling the circulating fluid. This blubber yields a great quantity of excellent oil.

The food of the fish seems to bespeak its living at the bottom of the water; for the common matter found in its stomach is the remains of fish that live in or on the bottom. The young porpessæ are generally found to feed on the ammodytæ, or sand-eels, and sea-worms.

We have from Dr. Lister an account of the tooth of this creature, after death, giving an envenomed wound. The accident happened to the doctor himself, and he relates it in *Phil. Trans.* N^o 233. *Abridg.* vol. ii. p. 842.

PORPHYRA, in *Botany*, so named from the purple colour of the flower.—*Lourec. Cochinch.* 69.—Class and order, *Tetrandria Monogynia*. *Nat. Ord.*

Gen. Ch. *Cal.* Perianth inferior, abrupt, permanent. *Cor.* of one petal, bell-shaped; tube longer than the calyx; limb in four deep rounded segments. *Stam.* Filaments four, twice the length of the corolla, inserted into its base; anthers ovate, erect. *Pist.* Germen roundish; style thread-shaped, equal to the stamens; stigma roundish, abrupt. *Peric.* Berry globose, of one cell. *Seeds* three, convex at the outside, angular at the inside.

Ess. Ch. *Calyx* inferior, abrupt. *Corolla* bell-shaped, in four deep segments. *Berry* with three seeds.

1. *P. dichotoma*. Tû hōa uôn of the Chinese.—Native of hills about Canton, in China. A *shrub* three feet high, erect, with many weak, straight branches. *Leaves* opposite, nearly sessile, lanceolate, serrated, dotted. *Clusters* axillary, forked. *Flowers* purple. *Berries* very small, copious, violet-coloured, globose, fleshy.—We know nothing of this genus, which seems nearly related to *Callicarpa*, but from the author quoted.

PORPHYREUM, or PORPHYREON, in *Ancient Geography*, a town of Phœnicia, between Berytus and Sidon. *Steph. Byz.* says, that it derived its name from its situation on the coast, near which was found the fish that afforded the purple dye.

PORPHYRIANA ARBOR. See ARBOR.

PORPHYRIANS, in *Ecclesiastical History*, an opprobrious name given to the Arians, by an edict of Constantine, at the council of Nice, in 325. *Cap.* 36. *apud Hard. Concil. tom. i.* p. 446.

That prince, publishing an edict against Arius and his writings, declares, that as Arius had imitated Porphyry in composing books against religion, he deserves to be noted with his infamy; and that, as Porphyry is become the reproach of posterity, and his writings suppressed, so he wills, that Arius and his followers be called *Porphyrians*, &c.

PORPHYRIO, in *Ornithology*, the name of a bird figured and described by all the natural historians from one another, but which, it seems, none of them ever saw; and there is some room to doubt whether there be in nature any such bird. According to the accounts we have of it, it appears to be one of the gallinula or moor-hen kind, and is all over of a fine deep blue, only the middle of the tail is at the extremity of a greyish-white; its legs and feet are of a fine shining purple. There have been some fabulous things related of it, as having five toes on each foot, and the like; but if there be any such creature, it seems to be a moor-hen of these remarkable colours. In the Linnæan system this is a species of *Fulica*. The name is also given to other species, for which see *FULICA*.

PORPHYRIO *Refescens* is also a name given by Briffon to a variety of the *RALLUS Crax*; which see.

PORPHYROGENITUS, in *Antiquity*, an appellation given to the children of the Eastern emperors; implying as much as *born in purple*.

Cedrenus will have the word to signify, *born in the purple palace*, or the *palace of porphyry*, a palace so called in Constantinople, in which the empresses used to lie in. Others derive the appellation hence, that the imperial children, as soon as born, were wrapped in purple; others from this, that the chamber, in which they were born, was hung with purple hangings.

This term is sometimes found on the medals of the lower empire, struck at Constantinople.

PORPHYRY, in *Biography*, one of the most learned and celebrated preceptors of the Plotinian school, and an inveterate enemy to the Christian faith, was descended from an honourable family of Tyre, in Phœnicia, in the year 233. His original name was Meleck, which, in Syriac, signifies king, and hence he was sometimes called King. Afterwards Longinus changed his name into Porphyry, signifying in Greek purple, which was usually worn by kings and princes. He was introduced at an early age to the study of literature and philosophy under the Christian Origen, whose school he probably attended at Cæsarea, in Palestine: afterwards he went to Athens, where he became a pupil of Longinus, and improved his taste in literature. He was at Rome in the year 253, but did not then make a long stay there, but came thither again when he was about thirty years of age, and put himself under the instruction of Plotinus, who in a short time regarded him as one of the brightest ornaments of his school, and frequently employed him in combating the objections of his opponents, and in explaining to his younger pupils the more difficult parts of his writings. He even confided to him the care of methodizing and correcting his works. At the age of thirty-six he formed a resolution of putting an end to his life, in order that, according to the Platonic doctrine, he might release his soul from her wretched prison the body. Plotinus prevented the execution of his design. He was in Sicily when Plotinus died in Campania, and appeared in the character of an open and implacable adversary to the Christian religion. It has been said, that he was originally a believer in Christianity, but there is no proof of the fact, though he probably gained some acquaintance with the scriptures while he was a child, and pupil of Origen. The treatises of Porphyry against Christianity were supposed to have been written in Sicily: they are now lost, and are said to have been partially destroyed, through orders issued by the emperor Constantine. Many of them were extant in the fifth century, and were known to Jerome, who made large extracts from them. From Sicily Porphyry returned to Rome, where he taught the doctrines of Plotinus, and acquired great celebrity for learning and eloquence. He pretended to be divinely inspired, and relates, that when he was in the sixty-eighth year of his age, he was in a sacred extacy, in which he saw the supreme intelligence, the God who is superior to all gods, without an image. He married a widow, not he said for the sake of having children by her himself, but that he might have an opportunity of educating those which she had borne to a former husband. He died at Rome about the year 303. "He was," says Enfield, "a writer of deep erudition, and had his judgment and integrity been equal to his learning, he would have deserved a distinguished place among the ancients. But neither the splendour of his diction, nor the variety of his reading, can

atone for the credulity, or dishonesty, which filled the narrative parts of works with so many extravagant tales, or interest the judicious reader in the abstruse subtleties and mystical flight of his philosophical writings." His works were very numerous, of which a long catalogue has been given by Suidas, Fabricius, and others. The fragments that remain of them may be found in Lardner, to whom we refer our readers, and also to Enfield's Hist. Phil.

Porphyry was author of several works upon music, some of which are still preserved, particularly his "Commentaries on Ptolemy's Harmonics," which is published in the third volume of Dr. Wallis's mathematical works, with Ptolemy and Bryennius, which, with the seven Greek writers on music, published by Meibomius in 1652, include all the Greek treatises on the subject of music that are come down to us.

PORPHYRY, in *Mineralogy*, derived from *πορφυρο*, purple, in reference to its colour, is a denomination that distinguishes a large class of primitive rocks, composed of one substance in the form of grains or crystals, imbedded in another consisting most commonly of a compact paste, as its basis. The base is clay-stone, horn-stone, compact felspar, pitch-stone, pearl-stone, or obsidian; the implanted grains or crystals are of quartz or felspar. Of porphyry there appear to be two formations; the most ancient consists principally of horn-stone and felspar porphyry, and the most recent are of clay, pitch-stone, pearl-stone, and obsidian porphyry. The porphyritic formation is not very distinctly separated from the other rock formations which accompany it, nor is its rank among the primitive mountains, with regard to antiquity, very clearly ascertained. The mountains of porphyry are not stratified, and never enclose beds of other substances. Its texture is commonly compact, but it occasionally occurs in schistone. It is not very rich in mineral veins; the clay porphyry is the most rich. The mines of Schweitz, in Hungary, which are of this description, are found in this species of rock. Some writers have reckoned five species of rocks belonging to the proper porphyritic formation, which are as follow: viz. 1. *Horn-stone porphyry*, the base of which, being horn-stone, is generally red or green, with a conchoidal or splintery fracture; and inclosing crystals of quartz and felspar. This is also distinguished, says Kirwan, by its hardness, slight transparency, and want of lustre; it is fusible without difficulty. Sometimes the felspar is decayed, and sometimes also the horn-stone, whilst the quartz and hornblende remain entire: the whole thus acquires the appearance of indurated volcanic ashes, though the quartz might prove the contrary: if the felspar alone be decayed, the horn-stone will appear porous, and may be taken for lava. Its transitions are into granite and sand-stone. 2. *Felspar porphyry*, the base of which is commonly red compact felspar, inclosing crystals of felspar and quartz. (See FELSPAR.) 3. *Sienitic porphyry*, which differs from the preceding in containing crystals of hornblende in addition to the other ingredients. 4. *Pitch-stone porphyry*, the base of which is pitch-stone, either red, green, brown, grey, black, or yellow, of various shades, having generally many colours at once in the same specimen. According to Kirwan, this porphyry has the following characters; lustre greasy, 2.1: transparency, 2.1: fracture, imperfectly conchoidal: hardness, 8, 9, 10: the felspar often blue: the fracture of some is slaty, and colour yellowish-grey; lustre, scarcely 1; transparency, 1; hardness, scarcely 9; specific gravity, 2.452. 5. *Clay porphyry*, the base of which is indurated clay, passing into horn-stone; generally of a reddish colour, and containing crystals of quartz and felspar. The colour of this

PORPHYRY.

this porphyry, belonging to Kirwan's Argillaceous porphyries, is generally some shade of grey, or greenish-grey, or brown, or blackish or reddish-brown, or isabella yellow. Lustre and transparency, 0; fracture, earthy; hardness, from 5 to 7; sometimes adhering to the tongue. The metalliferous stone of Born, or graustein of the Germans, celebrated in Hungary, is of this species; its colour being some shade of green, inclining to black, rarely reddish, and consisting of indurated clay, in which are found hornblende, felspar, mica, and quartz. This porphyry is much subject to decay; the felspar either moulders, or loses its lustre; and also the hornblende; and the whole has been thus mistaken for volcanic traafs. The reddish porphyry of the Hartz, whose specific gravity is so low as 2.405, is probably of this species. Also the porphyry of the Pottchapel, described by Mr. Weifs; which consists of quartz, felspar, and mica, held together by a grey clay, and there called a white sand-stone. The isabella yellow clay porphyry of Leske is remarkable: it has the earthy aspect of a marle. Its lustre and transparency, 0; fracture, earthy; hardness, 9; specific gravity, 2.563; melting at 148° into a greyish glazed porcelain: the felspar in this stone is ochre-yellow, and easily distinguished while the stone is undecayed, but it is very subject to moulder.

Mr. Kirwan refers the porphyry to the class of aggregated stones, and says, that any stone, which, in a siliceous or argillaceous ground, or basis, contains scattered specks, grains, or dots of felspar, visible to the naked eye, is at present denominated a porphyry: but with felspar it generally contains quartz, hornblende, and mica, which imbedded, or inhering, stones are generally of a different colour from the ground, in which, as in a cement, they are stuck and crystallized. Of late, he adds, this name has been given to stones which do not visibly contain felspar. He distinguishes four sorts of porphyry, viz. the *siliceous*, *argillaceous*, *muritic*, and *calcareous*, most of which may be compact, or shistose, or slaty. The specific gravity of porphyries varies with the nature and proportion of their bases. Under the head of *siliceous* porphyries, Kirwan enumerates those, which have either jasper, horn-stone, pitch-stone, obsidian, siliceous shistus, shistose horn-stone, or felspar itself for their basis. The existence of jasper porphyry has been questioned. Of the horn-stone and pitch-stone porphyries we have already given an account. The obsidian porphyry is black or greyish-black; its lustre glossy, 3.2; transparency, 0 or 1; fracture, perfectly conchoidal; hardness, 10. The horn porphyry, or porphyry schiefer of Werner, has siliceous shistus, or horn-slate for its basis: it frequently contains hornblende and quartz much more apparently than felspar; its ground is generally blueish, or greenish, and the felspar white, and often very minute; lustre, 1; transparency, 0 or 1; fracture uneven, coarse, or fine splintery; sometimes tending to the conchoidal, frequently slaty in the gross; hardness, 9.10. It is often decomposed, or disintegrated; its grain is often as fine and close as that of horn-stone, but in that case does not give fire so smartly as the horn-stone of fine grain. It passes into argillite and trap. The basis of the horn porphyry, according to Leske, seems to be a kind of mean between siliceous shistus and argillite: its colour blueish-grey, with some reddish and whitish specks; fracture, thin slaty; hardness, 10; and surface shews a whitish-brown crust from decomposition. The petunse porphyry has felspar for its base; its colour is generally yellowish-brown, or reddish-brown, or brownish-red, or reddish-grey, or flesh-coloured, or yellowish-red: lustre, 0; transparency, 0, or scarcely 1; fracture unequal, or earthy, or fine splintery, or presenting small

folia or lamellæ, exhibits often distinct concretions; hardness, 10.

The *argillaceous* porphyries may have indurated clay, hornblende, trap, wacken, mullen, kragg, or argillite, for their basis. Those with indurated clay for their basis we have already mentioned. The hornblende porphyry, or ophtes of Briffon, denominates masses of sienite, in which the hornblende abounded. (See above.) The colour of the basis is black, or greyish-black, or dark-green, or yellowish-green; the fracture striated, or foliated; specific gravity, when the proportion of hornblende is considerable, 2.972. The trap porphyry has its colour greyish, or blueish-black, or blackish, or reddish-brown, or greenish-grey; lustre and transparency, 0; fracture, earthy, or fine splintery; hardness, from 7 to 9; specific gravity, exceeding 2.7. Sometimes abounding so much in quartz and felspar as to have its hardness 10. (See TRAP.) *Wacken* porphyry is greenish, blackish, reddish, or yellowish-grey, or greyish-black, or liver-brown; lustre and transparency, 0; hardness from 6 to 9; fracture even, earthy, seldom uneven; feeling somewhat sandy. *Mullen* porphyry is blueish-grey, light or dark; lustre and transparency, 0; fracture uneven, and fine splintery; hardness, from 7 to 9; specific gravity, from 2.6 to 2.728. *Kragg* porphyry is greyish-red, or dark-purplish red; lustre and transparency, 0; exceedingly porous; fracture uneven and earthy; hardness, from 5 to 7; feels rough and harsh; gives a yellowish-grey, or reddish streak; often verges to sand-stone. *Argillitic* porphyry is distinguishable from the preceding not merely by its slaty fracture, but also generally by its lustre, and often by its slight transparency. *Novaculite* porphyry is greenish-grey, or greyish-yellow; lustre, 0; transparency, 1, 1.5; fracture fine splintery, earthy, or slightly conchoidal; but in the gross, often slaty; hardness from 7 to 8, rarely 9; feels somewhat greasy.

The *Muritic* porphyries have either potstone or serpentine for their base. Potstone porphyry is greenish, reddish, or yellowish-grey, or speckled with red, or leek green: lustre, 2.1; transparency, 1.0; fracture, undulatingly foliated; the folia very thin; its hardness, from 4 to 6; sp. gr. exceeds 2.7. The serpentine porphyry is dark or olive-green, or greenish-grey, or brownish-red, or greyish-blue, or yellowish, and yellowish-green: lustre, 0; transparency, 1.0; fracture fine splintery, often passing to the uneven; hardness, from 6 to 7; sp. gr. not exceeding 2.7; feels rather soft; found near Florence.

When porphyry is overloaded with felspar, it is difficult to say whether it be a granite or a porphyry, which hath a granitel for its base. To this sort we may annex porphyries, the ground of which makes the smallest part, such as that described by Herman, 2 Chy. An. 1790, 21, which he calls a "porphyrite." It consists of small sparks of felspar, grains of quartz, splinters of hornblende, and fragments of shorl, cemented together by a scarcely discernible jaspidean cement: lustre, 0; fracture fine splintery; hardness, 9; transparency, 0; colour greyish, black, or red, or white. To the species of sand-stone porphyry we may refer the yellowish-grey argillaceous sand-stone, which contains large grains of felspar and quartz; this readily moulders by exposure to the air. Derivative stones are also frequently the ground of porphyries, of which sort is the "earthy horn-stone porphyry." Colour, dark reddish-brown; lustre, 0; transparency, scarcely 1; fracture, fine splintery; fragments, nearly 3; hardness, 9; sp. gr. 2.617. The felspar is scattered, small, and white. Kirwan's El. of Mineral. vol. i.

Porphyry, on account of its hardness, has furnished the

apothecaries and colourmen with stones on which to grind or levigate their powders, and the same quality renders it applicable to other similar purposes. As it is also capable of the most beautiful polish, the porphyry, and the red and black in particular, has been much employed in architectural ornaments; so that temples and public buildings, as well as private houses, have been decorated with it. For this purpose it has been used of different hues and variegations of colour. In a church at Rome there are two exquisitely fine columns of black porphyry, mentioned by Ficoroni. There are also three famous pillars, or obelisks, of porphyry in Egypt; one near Cairo, and the other two at Alexandria. The French call them "Aguglias," the English "Cleopatra's Needles;" which see. Porphyry of different shades of colour is found in Arabia Petræa, in Egypt, in Germany, in Sweden, in France, in Minorca, in many parts of England and Ireland, and in other countries. M. Dorthes has described more than twenty varieties of porphyry thrown up in pebbles by the Mediterranean upon the French coasts, whither they are brought by the Rhone; and many have been found on the British shores, and in some parts of Devonshire far from the sea.

The art of cutting porphyry, practised among the ancients, seems lost. In effect, it is hard to conceive what kind of tools they must have used for the fashioning of these huge columns, and other porphyry works found in some of the antique buildings in Rome.

One of the most considerable pieces, now remaining entire, is a tomb of Constantia, daughter of the emperor Constantine, in the church of St. Agnes without the walls; ordinarily called *the tomb of Bacchus*, because of several boys represented in it, playing among the vine-leaves. Add to this Apollo's, and the busts of twelve emperors, all in porphyry, in the palace of the Thuilleries.

Some of the ancient pieces appear to have been wrought with the chissel, others with the saw, others with wheels, and others ground down by degrees with emery. Yet the modern tools will scarcely touch porphyry: it should seem, therefore, and Dr. Lister (Phil. Trans. N^o 203, or Lowth Abr. vol. ii. p. 560.) adopts this opinion, that the ancients had the secret of tempering steel better than we; not, as some incline to think, that they had the art of softening the porphyry; though it is probable that time and air have contributed to increase its hardness.

Mr. Addison tells us, he saw a workman at Rome employed in the cutting of porphyry; but his advances were exceedingly slow, and almost insensible.

The method which the Italian sculptors use to work the pieces of old porphyry columns still remaining (for the porphyry quarries are long since lost), is with a brass saw without any teeth. With this, together with emery and water, they rub and wear the stone with infinite patience.

Yet have many excellent persons endeavoured to retrieve the ancient art, particularly Leon Baptista Alberti; who, searching for the necessary materials for temper, says, he found goat's blood the best of any; yet even this availed but little; for, in working with chissels thus tempered, sparks of fire came much more plentifully than pieces of the stone. By these means, the sculptors were able to make a flat or oval form; but could never attain to any thing like a figure.

It is true, in 1555, Cosmo de Medicis is said to have distilled a water from certain herbs, with which his sculptor, Francesco Tadda, gave his tools such an admirable hardness and temper, as that he performed some fine works with them; particularly our Saviour's head in demi-relievo, and Cosmo's head, and his duchess's. Even the very hair and beard, how difficult soever, are here well conducted;

and there is nothing of the kind better in all the works of the ancients: but the secret seems to have died with him.

The French have lately found another method of cutting porphyry, viz. with an iron saw without teeth, and *grez*, a kind of free-stone pulverized, and water. The authors of this invention pretend they could form the whole contour of a column by it, had they matter to work on.

Others have proposed a method of hardening tools, so as to make them proper to cut porphyry, by steeping them in the juice of the plant called bear's breech, or brankursine. Birch's Hist. R. S. vol. i. p. 238. vol. ii. p. 73, &c.

Mr. Boyle tells us, that he caused porphyry to be cut by means of emery, steel saws, and water. He observes, that in his time, the workmen in England were ignorant of the manner of working upon porphyry, and that none of them would undertake to cut or polish it. See Works, abr. vol. i. p. 111.

M. Da Costa conjectures, that the method used by the ancients in cutting and engraving porphyry was very simple, and performed without the aid of any scientific means that are now lost. He supposes that, by unwearied diligence, and with numbers of common tools at great expence, they rudely hewed or broke the stone into the intended figure, and by continued application reduced those rude figures into more regular designs; and that they completed the work by polishing it with great labour, by the aid of particular hard sands found in the country of Egypt. And he supposes, not without reason, that, in the porphyry quarries, there were layers of grit, or loose disunited particles, analogous to the porphyry which they carefully sought for, and used for this work. Nat. Hist. of Fossils, p. 285.

PORPHYRY-Shell, in *Conchology*, a name given by authors to a species of sea-shell of the purpura kind, with a short clavicle and beak.

PORPITA, in *Natural History*, a species of *Medusa*; which see.—Also, a species of *Madrepersa*; which see.

PORPITES, the *Hair Button-stone*, a name given by authors to a small species of fossil coral; which is usually of a rounded figure considerably flattened, and striated from the centre every way to the circumference. These are of different sizes, and of different colours, as greyish, whitish, brownish, or blueish, and are usually found immersed in stone.

PORPOISE, CAPE, in *Geography*, a cape on the coast of York county, in the state of Maine; 5 miles S.W. of Wood island.

PORPORA, NICOLA, in *Biography*, began to contribute to the lustre of the Neapolitan school about the same time as Leo. Porpora had great merit of various kinds; but in composition his style was feeble, compared with that of Leo and Handel, his two most powerful rivals in point of force. He had likewise rivals in grace and elegance, in Vinci, Haffe, and Pergolesi. Yet in other respects he had talents peculiar to himself: he was the best singing-master in Europe, and formed the greatest singers of his time. He was fortunate, indeed, in the voices he had to cultivate, particularly that of Farinelli. Porpora was more a man of judgment than genius. Of his opera of Arianna, the first which was performed in England, as little of the music was printed, and a MS. score is not to be found, we are unable to speak of its merits, but by analogy. His other operas and cantatas which we have seen, are written in a good taste; the melodies of the airs is natural and graceful; and the recitatives, particularly of his cantatas, are still regarded in Italy as models of perfection for narrative music. In his airs he rather polished and refined the passages of other composers than invented new; and in his accompaniment there

there is nothing very picturesque or ingenious. His first opera of *Ariadne and Theseus*, which Rolli pretended to have written expressly *per la nobiltà Britannica* in 1734, was performed at Vienna in 1717, and at Venice in 1727. The operas which Porpora composed for Naples, Rome, and Venice, before and after his arrival in England, amount to more than fifty. In 1736, during his residence in London, he published six *Sinfonie da Camera*, or trios, for two violins and a base, which he dedicated to the late prince of Wales; but these, like almost all the instrumental music of *vocal composers*, except that of Handel and the late John Christian Bach, are fanciful, and no more fit for one instrument than another. Indeed, Vinci, Haffé, Pergolesi, Marcello, and Porpora, the great luminaries of vocal compositions, seem never to have had any good thoughts to bestow on music merely instrumental. Perhaps the superiority of vocal expression requires fewer notes in a song than a sonata; in which the facility of executing many passages that are unfit for the voice, tempts a composer to hazard every thing that is new. Thus the simplicity and paucity of notes, which constitute grace, elegance, and expression in vocal music, render instrumental meagre and insipid.

Porpora was long the principal master of the *Incurabili Conservatori* at Venice, for which he composed several masses and motets, that are held in great estimation by the curious. He retired, however, late in life, to Naples, the place of his nativity, where, in 1767, he died in great indigence, at the advanced age of 82. Corri, who had studied under him five years, was his disciple at the time of his decease; and he says, that though his friends paid him a considerable sum, not only for his instruction, but board, Porpora kept so miserable a table, that he was frequently driven out of the house, by hunger, to seek a dinner elsewhere.

PORPORINO, ANTONIO UBERTO, in 1772 was the principal singer for male parts in the opera at Berlin. His voice was a *contralto*. He had been more than twenty years in the service of his Prussian majesty, and was extremely admired for his taste and expression, particularly in singing adagios.

PORPUS POINT, in *Geography*, a cape in the straits of Magellan. S. lat. $53^{\circ} 8'$. W. long. $71^{\circ} 17'$.

PORQUEIRA, a town of Portugal, in Estramadura; 6 miles S.W. of Leyria.

PORQUERIZA, a town of Spain, in Catalonia; 13 miles E. of Cervera.

PORQUEROLLES, a small island of France, the principal of those called "Hieres," about 10 miles long, and $2\frac{1}{2}$ wide; defended by an old castle, and a small fort. N. lat. $47^{\circ} 30'$. E. long. $6^{\circ} 17'$.

PORRACEOUS, formed from *porrum*, *leek*, in *Medicine*, a term applied to the bile, fæces, &c. when their colour is green, approaching that of a leek.

PORRENTROI, or PORENTRUY, in *Geography*, a town of France, and principal place of a district, in the department of the Upper Rhine, lately belonging to the diocese of Bâle, and residence of the bishop, populous and well-built, and situated in a fertile district. The inhabitants are chiefly Protestants; 21 miles S.W. of Bâle. The place contains 2032, and the canton 12,191 inhabitants, on a territory of $272\frac{1}{2}$ kilometres, in 31 communes. N. lat. $47^{\circ} 30'$. E. long. $7^{\circ} 1'$.

PORRETANI, in *Ecclesiastical History*, a religious sect, the followers of Gilbert de la Porree, bishop of Poitiers, condemned by Eugenius III. in the council of Rheims, held

in 1147, for admitting a physical distinction between God and his attributes; or, as Marsham says, for having written too curiously on the subject of the Trinity: as to his real sentiments, we are not well acquainted with them.

However, he gave occasion for those suspicions, by maintaining that this proposition, "Deus est bonitas," is not true, unless reduced to this, "Deus est bonus." And there are some passages noted by St. Bernard, who wrote warmly against him, in which he seems to admit a real distinction between the nature of God and his attributes. The Porretani are set in opposition to the Nominals.

PORRIGO, in *Medicine*, an obstinate contagious disease, generally of a pustular character, principally, though not exclusively, affecting the scalp, and most commonly observed in children. According to the different appearances which it assumes, it is variously denominated in popular language, the *scalled head*, *honey-comb scab*, the *ringworm* of the scalp, &c.

It is not easy to give a definition of this disease, which shall be applicable to all its varieties of form; whence not only the popular voice, but the nomenclature of the learned has multiplied its appellations, and subdivided it into a number of distinct diseases, which have been scarcely acknowledged to belong to the same family. Celsus seems to have included most of its varieties under the denomination of *porrigo*, and his authority is not to be questioned: nevertheless he also treats of the species of ulcer or pustule, which is called *favus*, or *κηρίον*, the smaller species of which, he says, is peculiar to the head, and produces foramina about the roots of the hair; and likewise of those forms of baldness, which are called *alopecia* and *ophiasis*, the former of which is usually seen in children. Most of the modern writers, however, limit the signification of *porrigo* to a furfureous or scurfy affection of the scalp, considering it as synonymous with the *pityriasis* of the Greeks; and they have adopted a generic term, (borrowed probably from the Arabians,) under which they include several of the varieties of this contagious disease, namely, *tinea*, or *tinea capitis*. (See Sauvages, *Nosol. Method. class. x. gen. 29*, where this term is used in the same generic sense in which we here employ the term *porrigo*.) Some of those writers, however, who have described these affections under the various appellations of *crusta lactea*, *achores*, *scabies capitis*, *alopecia*, *pityriasis*, *favi*, *tinea*, &c. have nevertheless pointed out the identity of the nature and causes of these eruptions in general. (See especially the treatise of the able and learned Sennertus, "De Morbis Infantum," p. ii. cap. 4; and also his general work, entitled "Practicé," lib. v. p. iii. § 2. cap. 4; also Heister, *Chirurg. p. i. lib. v. cap. 10*; and Plenck, "Doctrina de Morbis Cutaneis.") Dr. Willan adopted the term *porrigo*, in the same sense with the more ordinary term *tinea*, in consequence of the classical authority of Celsus for its employment in that sense. See Bateman's *Practical Synopsis of Cutan. Diseases*, according to the arrangement of Dr. Willan, p. 158.

Different writers have divided the disease into various species. Sauvages has described no less than nine species; Dr. Willan, as we learn from Dr. Bateman's *Synopsis*, included all the forms under six species; Alibert has mentioned only five; and Plenck, in addition to the *crusta lactea* and *tinea*, has delineated four species of *scabies capitis*. Similar divisions were made by the Arabian writers, and Haly Abbas especially described six species, which have been nearly the prototypes of those of all the writers just named, who have borrowed even his specific appellation. These species are distinguished by the different magnitude of the pustules, or by the absence of pustules, and by the

formation of crusts and scabs, or of branny scales, in which they terminate.

From the time of the Greek physicians, the pustules which constitute the different species of this disease have been denominated ἀχῆρες, *achores*, and κηεις, *favi*, which are considered as differing from each other only in magnitude; the latter being larger than the former. The term *favus*, honey-comb, has been applied to the ulceration which follows this larger pustule, and therefore to the pustule itself, in consequence of the number of large foramina which are produced by the pustules, and from which a thick viscid discharge takes place, which has been compared also to honey. Thus Paul of Ægina says, "Of the affections which take place in the scalp, the *achor* is one, which erodes the surface with very small foramina, from which a glutinous humour is discharged: the *cerion* or *favus* is of the same kind, but produces larger foramina, and emits a honey-like discharge, like the favi or combs of bees." (De Re Medica, lib. iii. cap. 3.) The other Greek writers express the same opinion in nearly the same terms, which it is unnecessary, therefore, to repeat. (See Alex. Trall. lib. i. cap. 8, and 9. Aëtius, tetrab. ii. serm. ii. cap. 68.) The discharge emitted by these pustules, whether large or small, is contagious in its qualities, and communicates the same disease to the heads of those to whom it is conveyed by clothes, or by actual inoculation by contact.

Species 1.—The *milk-crust*, or *crusta lactea* of authors, has been ranked as the first species of this disease by Sauvages, in which he has been followed by Dr. Willan; the former denominating it *tinea lactea*; the latter, *porrigo larvalis*. Plenck calls it *rabies capitis larvata*. We are not quite satisfied, however, of the propriety of arranging this *milk-crust* in general with the true porriginous affections; especially since it appears only in early infancy, and independently of any contagious influence, and is usually, if not always, incapable of affecting others by contagion. Its characters, on the whole, more nearly resemble those of impetigo, in the classification of Dr. Willan, to which perhaps it ought to be referred. The face, as the epithets *larvalis* and *larvata* (which signify *masked*) indicate, is the seat of this unsightly eruption, which appears in the form of extensive patches of a thin, yellowish, greenish, brownish, and sometimes of a dirty-white scab or crust. Generally one large patch extends along the whole forehead, from the eye-brows to the roots of the hair of the scalp; and each cheek is covered with another of considerable extent, and of a circular form. Sometimes the chin is likewise affected; and occasionally, indeed, the whole face is enveloped in a continuous crust, forming an entire mask, through which the eyes, eye-lids, and nose, alone present themselves free from the disease. These scabs, like all similar incrustations, are the result of the concretion of the viscid purulent matter, which is discharged from the small pustules, or *achores*, with which the disease commences. This discharge varies materially at different times, in the course of the progress of the disease. Sometimes it nearly ceases, and the crust remains dry, or even falls off, leaving a red and irritable surface; and sometimes it is so copious, and flows with a constant oozing from small pores, that no concretion takes place, and the cuticle is in a state of constant excoriation. These conditions commonly alternate with each other, at intervals, during the continuance of the complaint. In some instances, the eruption is confined to the face; but in general the ears are affected, especially round the back part of them, and the scalp becomes partially incrustated with patches of the scabs. The eruption is, under all its changes, accompanied by a considerable degree of itching and irrita-

tion, which excites a constant disposition to rubbing and scratching the face, by which the crusts are partially torn off, and the surface is excoriated, and made to bleed; and thus the irritable condition of the diseased part is augmented. By this continued irritation, the constitution becomes at length affected, in consequence of the loss of sleep, and of the derangement of the digestive organs, so that the little patient is sometimes emaciated, an habitual feverishness prevails, the absorbent glands, both parotid and mesenteric, become enlarged and indurated, and a fatal marasmus ensues.

In the majority of cases, however, the disease is compatible with tolerable good health; and after continuing, with various fluctuations, for many weeks, and sometimes many months, it usually terminates favourably, without leaving any scar, pit, or other deformity, notwithstanding the extent or continuance of the disease, as Sauvages long ago remarked. It has received its denomination of *milk-crust*, from its ordinary occurrence during the time of lactation; and it often ceases immediately after the child is weaned. Sometimes it appears to be relieved by the protrusion of the teeth. An observation has been made by Dr. Strack, in a treatise written expressly upon this disease, which we have not had any opportunity of verifying, namely, that the urine of the patient assumes the same odour as the urine of cats, previous to a favourable change in the symptoms. See Strack, Diss. de Crusta Lactea Infantum, et ejusdem specifico Remedio.

For the cure of this disease, most writers recommend a change of nurse, or actual weaning, ascribing it, as its name imports, to the influence of the milk. The former, however, is not always practicable, nor is either plan always successful. Indeed the disease will commonly continue a considerable time under any measures that may be resorted to. The inflammatory disposition of the surface, and consequently the discharge and incrustation which result from it, may, however, be often alleviated, and its termination expedited, by a repetition of certain alterative medicines, of which mercury especially makes a part. Small doses of the hydrargyrus cum sulphure, or old æthiops mineral, combined with a little dried soda, or nitre, administered twice a day, appear to be very beneficial in some individuals; in others more active medicines are required, comprising the submuriate of mercury, so as to act more freely on the bowels; especially where there is a torpor of the canal, or a disposition to marasmus, with enlargement of the mesenteric glands, tumid abdomen, and a constant febrile condition.

As to external applications, they must be varied according to the condition of the eruption. While the surface is inflamed, excoriated, and humid with the discharge, every application of a stimulating nature should be avoided, such as the use of soap in washing, and of acrid liniments and ointments; gentle washing, with some mild tepid fluid, such as milk and water, or simple water, or light decoctions of the farinaceous seeds, barley water, gruel, &c. with soft linen, and without much friction, will be beneficial; and, under the same circumstances, simple lard, or a mild saturnine or zinc ointment, or some other softening and drying unguent, should be applied twice a day. When the inflammatory condition has declined, and the discharge has nearly subsided, some gently stimulant ointment, especially of the mercurial class, should be employed; such as a diluted citrine ointment, in the proportion of one-fourth of the latter, or the ointment of the white precipitate of mercury, diluted one half; which may be strengthened, as the surface becomes less irritable, and the crusts cease to form. The "remedium specificum"

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specificum" alluded to by Dr. Strack, is the common viola tricolor, a decoction of which he recommends to be made in milk, in the proportion of a handful of the fresh, or half a drachm of the dried leaves, to half a pint, and to be taken night and morning. He affirms that this medicine invariably cures the disease in the third week, although it seems to augment the eruption during the first fortnight. The only other testimony that we have seen, relative to the virtues of this specific, is that of professor Selle, who affirms, in contradiction to Strack, that the medicine is either actually prejudicial in this eruption, or altogether inert. See his *Medicina Clinica*, i. 185.

Species 2.—This species has been distinguished from the time of the Arabians by the same appellation by the best writers; namely, by the epithet *favosa*, indicating that the eruption consists of the larger variety of pustules, the *favi*, or honey-comb eruption. It is the *Tinea favosa* of Haly Abbas, of Astruc, and Sauvages; the *Scabies capitis favosa* of Plenck; the *Porrigo favosa* of Willan; and the *Teigne favuse* of Alibert. Under this species, however, we may include also the *Tinea humida*, and the *Tinea fcosa*, of Sauvages, and perhaps the *Teigne muqueuse*, or *Tinea muciflua*, and *Teigne granulée* of Alibert. (Sur les Maladies de la Peau, spec. 5. et 2.) The *Tinea volatica* of Sauvages appears also to be the same species of the disease, so named because it occurs on different parts of the body, as well as on the head.

Whatever may be the ultimate form which this species of the disease assumes, it always commences with the large *favi*, or soft, whitish pustules, which arise separately from each other, not acquiring much elevation above the surface of the skin, nor being preceded by much inflammation. They do not commonly exceed the diameter of a pea, and are somewhat flattened, and not very regularly circular; and, as Sauvages remarks, they are readily ruptured by slight pressure of the finger, or even spontaneously, pouring out a thick, viscid, pultaceous, yellowish-white matter, which dries into a greenish scab. The head is the most common seat of these pustules, which most frequently appear first above and behind the ears, or about the angles of the mouth. As they increase in number, they become confluent in irregular patches, sometimes extending over the whole scalp, and matting together the hair in masses of the scabs. In this condition, from the difficulty of using a comb, and from the peculiar tendency of the disease, great numbers of lice are often generated, which greatly aggravate the disorder by the irritation which they produce, and greatly increase the itching and smarting which belong to the disease, and therefore add much to the distress of the patient. This accumulated irritation, indeed, sometimes entirely deprives children of their rest, destroys the digestive powers, and induces emaciation, hectic fever, and at length complete marasmus. In children of scrofulous habit, under this extreme irritation, the eyes become inflamed, and the eyelids are ulcerated, discharging a thick glutinous pus, by which they are generally glued together in the night; the upper lip becomes tumid, the glands of the neck and lower jaw take on the scrofulous inflammation, and those of the mesentery are affected in a similar manner. In children of this constitution, indeed, the disease sometimes assumes an acute febrile form, the eruption being preceded by the usual rigors, heat, and disturbed functions, which characterize common fever, and continue after the eruption appears. In one instance, we have seen this acute form of the disease spread rapidly, by its contagion, through the children of a family. In other children, of a more decided scrofulous diathesis, the whole scalp sometimes becomes ulcerated, discharging copiously,

from numerous distinct superficial cavities, which are extremely red and tender, as well as the intervening portions of the scalp, a mucous or viscid fluid, nearly colourless; in which cases, the glandular system is almost invariably affected to a considerable extent, and the constitution suffers severely.

Although the head is the ordinary seat of these *favous* eruptions, yet they are not exclusively confined to the scalp and face, but occasionally occur upon the extremities, and even upon the trunk, although they are seldom seen on these parts without attacking the head also. Neither are children the only subjects of their attack, although the most frequent; for occasionally adults receive the contagion, and suffer considerably from the eruption; and occasionally it appears to originate under particular circumstances of the constitution. Adults, however, are not so liable to be affected by the disease; since it frequently happens that mothers and nurses receive the contagion, in those parts which come frequently in contact with the diseased parts of their children, as in the face, about the mouth, from kissing them, or on the mammæ from suckling, or on the arm in which they are held, where a single pustule or cluster of pustules forms, and gradually disappears, without any remedy.

Except in cases of exquisite scrofulous constitution, the varieties of *porrigo favosa* are more manageable by medicine than the foregoing species, and those of which we shall immediately treat. More dependence is to be placed on the constitutional, than on the local management of the disease, though the latter is of considerable importance. As the digestive organs are commonly deranged, and the functions of the bowels imperfectly performed, and there is some tendency to mesenteric congestion, the more active alteratives, containing small doses of calomel, with soda, and the testaceous powders, should be resorted to; or, if the bowels are very irritable, the grey oxyd, or the hydrargyrus cum creta may be substituted. In children who exhibit a squalid complexion, and other obvious marks of a cachectic condition, some tonic may be combined with alterative doses of a laxative; such as light infusions of calumbo, or cascarrilla, with rhubarb or a neutral salt; or the precipitated iron united with soda and rhubarb. At the same time all the attention that can be paid to the diet and regimen of the little patients, will be requisite to assist the operation of medicine; the exercise should be regular and frequent; the clothing warm; and the diet of a nutritious, but light and unstimulating quality. Milk, puddings, well-dressed vegetables, and a moderate portion of plain animal food, should constitute the food; and wine, fruits, especially unripe acid fruits, and crude vegetables, should be discarded. Sea-bathing, if the patient yet retain a considerable portion of vigour, is also to be recommended.

The external applications must be appropriated to the peculiar state of the disease. An ancient precept, which is to be found in the treatises of the Greek writers on this subject, cannot be too strictly attended to; namely, that in the inflammatory, excoriated, and discharging state of the scalp, the tender surface is not to be irritated by any stimulant, but softened and soothed by tepid and emollient applications; as by warm fomentations, or by poultices, or by the application of cream, or some simple ointment. The popular applications, such as a cabbage-leaf, oiled silk, and other rigid coverings, are sometimes productive of great aggravation of the disease, exciting a highly inflammatory state of the surface, and even considerable symptomatic fever, followed by ulceration and a copious purulent discharge. (See Bateman's Synopsis, p. 178.) When the inflammation and discharge have been reduced by these emollient means, the zinc ointment, or saturnine and mercurial ointments, mixed and diluted

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luted as already mentioned, will contribute to restore the surface to its healthy condition.

Species 3.—This is of a scaly, or *furfuraceous* character, and has been distinguished by all writers on the subject. The term *porrigo*, indeed, has been limited to this species by many authors, and by all the translators of the Greeks, who seem to have confounded this contagious branny eruption, with the non-contagious *dandriff*, under the appellation of $\pi\iota\tau\upsilon\delta\iota\sigma\iota\varsigma$, or *porrigo*, which they deem synonymous. Whence this species of the disease has been called *tinea porriginosa* (meaning *furfuraceous*) by Astruc and Sauvages: it is the *tinea furfuracea* of Sennertus, the *porrigo furfuracea* of Plenck, the *porrigo furfurans* of Willan, and the *teigne furfuracée* of Alibert. The intelligent Plenck properly pointed out the distinction, which has been subsequently repeated by Dr. Willan, between the mere scurfy pityriasis, and the contagious scurfy porrigo; for although he applies the term *porrigo* to both, yet he adds the epithet *vera* to the contagious disease; and calls the other *porrigo farinosa*, seu *spuria*. *Doctrina de Morbis Cutan.* class vii.

This is the least common form of the contagious porrigo, and different authors disagree as to the subjects whom it attacks; some asserting, that it occurs chiefly in adult persons, and especially in women; while others maintain, that it is seldom seen in adults, but most commonly appears in children above seven years of age. M. Alibert, who asserts the latter, is, however, not the most able authority. (See Bateman's Synopsis, and Alibert, before quoted.) Although the character of this eruption, when fully formed, is determined by the branny exfoliations which appear among the hair, yet the origin of these exfoliations is probably to be ascribed to the matter discharged from the *achores*, or minute pustules, which form in the scalp in the beginning of the disease. Afterwards, however, the pustules are not generally discernible; but when the scurf is removed by combing, the surface of the scalp appears of a rose-red hue, and smooth and shining in its texture, the hair in general being thin, and falling off in an irregular manner. At times there is a discharge of a viscid nature, which encourages the propagation of pediculi; and the itching, which is at all times considerable, is then much increased; sometimes the little pores, from which the discharge issues, pass into superficial ulcerations, but in general the surface is dry. This eruption is confined exclusively to the scalp, except that it occasionally extends a little way on to the forehead from the roots of the hair. It is not always easy to distinguish this eruption from the other scaly affections of the scalp; for the lepra, psoriasis, and pityriasis, especially the first and last, are frequently seated in the same part. These three diseases, however, are not communicable by contagion, they appear in larger and stronger scales, they do not interfere with the growth of the hair, they are not alternately dry and humid, for they never form any pustules, or occasion any discharge, unless the surface is broken by violence, and they are often accompanied by other patches of the same nature on other parts of the body.

The *furfuraceous* tinea is often very obstinate, like the rest of the species, under every mode of treatment; the principles of cure, however, are similar to those already laid down. It seems agreed by all writers, that constant shaving is peculiarly necessary in this form of the disease, with a view to facilitate the application of remedies to the diseased surface, and the frequent clearance of that surface of its branny exfoliations by tepid ablutions. From ancient times a variety of stimulant applications have been recommended to be made to the diseased scalp, such as liniments of frankincense, with oil or vinegar, or wine, oil of rue, decoctions

of fænugreek, beet-root, &c. (see Aëtius, before quoted, and Oribasius, Synopf. lib. viii. cap. 25.): and applications of a similar nature have been resorted to in modern times such as ointments of tar, sulphur, and the various mercurial compounds, especially the citrine ointment, and that of the red precipitate, and also ointments of hellebore, stavesacre, and other acrid vegetable substances. It is only in the dry and uninfamed state of the surface, however, that these stimulant substances can be applied with advantage; for, as in the preceding species of the disease, the nature of the applications must be varied, with the varying condition of the malady, and the stimulants especially must be superseded by applications of an opposite quality, when the surface becomes inflamed, moist, and irritable. The mildest ointments, as common cerate, light saturnine liniments, or the zinc ointments, should be resorted to under these circumstances, and soap, even of the least acrid kind, should be avoided in washing.

Species 4.—This form of the disease is popularly termed a *ringworm*, in common with many other eruptive complaints, on account of the circular figure of the patches in which it appears upon the scalp. Dr. Willan gave it the appropriate epithet of *scutulata*, (from *scutulum*, a little shield,) in allusion to the same figure; but other authors have included this species under the other forms already described, not conceiving that the mere mode of distribution was sufficient to constitute a distinct specific character. And, in truth, this might be arranged with propriety with either of the preceding species, since it puts on a considerable variety of form; in general originating in the smaller pustules, or *achores*, but not unfrequently exhibiting a branny exfoliation, and sometimes large pustules, or *favi*, and even dry and thick crusts, within the area of its patches. In general, the surface of the patches is smooth, sometimes red, and sometimes of a pallid or white hue, and almost always shining, and free from any cuticular lines, as if the cuticle were on the stretch; and this surface is interspersed with the small pustules, or the minute scabs that form upon them, or sometimes only with elevated points or papulæ, some of which desquamate, while in others small globules of pus form, converting them into *achores*. The hair, if it does not entirely fall off from the diseased patch, becomes extremely thin, a few straggling hairs only remaining; and about the roots of these the pustules are more apt to form. Until the diseased surface is beginning to resume its healthy condition, the hairs do not grow again, or if any new ones appear, they are of a thinner and more delicate texture, and commonly of a lighter colour than natural. So that the re-growth of thick and natural hair is the best criterion of the removal of the disease.

The patches of this species of porrigo vary greatly in size and number in different instances. Sometimes three or four small patches appear on different parts of the head, and these occasionally extend, and become confluent, so as to affect the greater part of the scalp, and sometimes only one large patch occurs, on the crown, or on one side over the ear, and will remain stationary for months, in spite of every application for its relief; but with considerable variations in respect to the inflammation and number of pustules, and to the discharge, incrustation, or exfoliations from the surface.

This disease appears to have become more prevalent of late than formerly in this country, so that it has been supposed to be a new complaint, or to have been imported from our colonies in warmer climates, where cutaneous diseases are said to be extremely prevalent. The disease, however, has been described by medical writers in all ages and countries; and as it is principally propagated by contagion, from actual contact with the matter of the pustules, and as we see it most commonly among children at school, it is probable that

its more frequent occurrence is to be ascribed to the multiplication of boarding schools, in which the contagion is more readily propagated than in private families or in day schools, where there is less opportunity of actual contact, or of using the combs, towels, hats, &c. of the diseased.

There is scarcely any limit to the catalogue of medicines, which have been recommended from ancient times for the cure of this among other forms of the disease; and, in our own times, every one is in possession of a nostrum, which is confidently pronounced a remedy for the malady. Nevertheless it is extremely difficult of cure, and has been known to continue, not only for many months, but for years, in spite of every mode of treatment that could be devised. The general character of the applications which have been employed, is that of active stimulants and irritants; such as tar, sulphur, mustard, turpentine, essential oils, and spirits; mercurial ointments, especially those of nitrico-oxyd, or red precipitate, the citrine ointment, that of the white precipitate, and the oxymuriate of mercury; other metallic salts, such as the sulphate of zinc, copper, and iron, the nitrate of silver, &c. in ointments and lotions; strong vinegar, borax, muriate of ammonia, and the mineral acids, both in lotions and unguents; and various acrid vegetable powders, such as hellebore, stavesacre, cocculus indicus, &c. It is probable that all these applications, separately and in various combinations, have been successful in removing the disease in different instances: but that they all very frequently fail, is also too well known. Their success or failure is not always to be anticipated from the appearances of the disease; so that under the same apparent circumstances, the same remedy will be sometimes active, and sometimes inert. This general principle, however, appears to be applicable; that if the eruption be in a highly inflammatory state, the milder and less irritating substances should be employed; and if it be torpid, and free from much irritation or discharge, the stronger stimulants may then be resorted to.

Several practitioners have adopted various means of destroying the morbid surface, which, upon being renewed, has not unfrequently become free from the disease, the new skin having assumed a healthy action. Thus, after blistering, a healthy surface has returned: but in many cases a blister produces only a temporary change, and the disease recurs upon the new skin. But as it is merely the cuticle which is removed by a blister, and the disease appears to be commonly seated deeper, in the true skin; so the simple vesication may not reach the root of the malady. When one blister has failed, however, a repetition of the application has sometimes proved successful. The morbid skin may be destroyed more effectually by corrosive or caustic applications; and these are perhaps still more successful than the more superficial vesications. Some have used the strong mineral acids, lightly brushing over the diseased patch, and then wiping off the fluid; and others have used the caustic potash, or the nitrate of silver; even after these applications, however, the disease is apt to return upon the new surface which succeeds.

As this contagious ringworm of the scalp is commonly the result of the application of infectious matter to the skin of the cranium, so it is usually a merely local affection, with which the constitution does not sympathize, and therefore the health is not at all disordered: hence local remedies alone are generally requisite. If, however, the constitution suffers from the irritation of the local disease, or if this becomes highly inflammatory, approaching in its nature to the second species above described, then a similar course of alterations will be necessary to that recommended for the cure of the first and second species, and the general health must be attended to by a proper regulation of regimen.

Species 5.—The patches of baldness which have been described by Celsus, under the generic term *area*, and by the Greeks and their translators under the appellations of *alopecia* and *ophiasis*, were included under this genus, *porrigo*, by Dr. Willan, with the epithet *decalvans*. As, however, no pustules are ever visible in these patches, nor are there any crusts, or even scales, nor is the surface excoriated, nor is there any kind of discharge, it might be questioned, whether this affection is properly associated with the pustular and contagious porrigo. It is said, however, that in schools and families, where the disease appears in several individuals successively, from the influence of the contagion, this form of the disease sometimes occurs among the rest, as the product of the same infection. But this occurrence is rare; and it is certain that these bald patches, which exhibit only a smooth, white, polished surface, free from any remnant of hair, occasionally appear, even in adults, where no suspicion of contagion existed; whence the majority of medical writers have deemed the *alopecia* a distinct disease.

Celsus recommends repeated shaving of the scalp for the cure of this affection, after which the bald parts were to be rubbed with the sulphate of iron (*atramentum futorium*). The disease is certainly often allied, in obstinacy at least, to the species before described, and seems to be the most advantageously treated by the application of some of the more active stimulants before enumerated, especially by the terebinthinate substances and essential oils, mixed with alcohol.

Species 6.—This species of the porrigo, which has been denominated from the time of the Arabians downwards with some allusion to the seeds of lupines, appears to be but a modification of the second, or *favous* species. Haly Abbas gave it the epithet of *lupinosa*, and described it as “*ficca, et colore alba, lupino similis, à quâ quasi cortices et squamæ fluunt.*” After him, Astruc and Sauvages called it *tinea lupina*; Plenck denominated it *scabies capitis lupina*, and also *porrigo lupina*; and Willan, *porrigo lupinosa*. It seems to differ from the second species merely in the dry, small, and nearly circular crusts, which it forms in consequence of the occurrence of the pustules in small clusters, and which may be compared, both from their shape and greenish hue, to the seeds of lupines.

The treatment required is very similar to that recommended for the second and third species, with the necessary addition of some means of removing the hard and dry crusts, in order to facilitate the application of remedial substances to the diseased surface. Copious ablution with warm water and soap will often effect this purpose, aided by the ointments, which also tend to correct the morbid surface, especially the mercurial preparations before mentioned; but sometimes it is necessary to have recourse to more caustic substances, as the pure alkalies diluted with water. Professor Selle considers those alkaline lotions as the most effectual means of removing these hard and durable scabs. “*Imprimis salia lixiviva ad crustam tam firmam atque alias insolubilem emolliendam sunt apta.*” See his *Medicina Clinica*, 187. See also Sennert. *Opera*, lib. v. part i. cap. 32. Haly Abbas, *Theorica*, lib. viii. cap. 18. Heister, *Chirurgia*, part i. lib. v. cap. 10. Underwood, on the Diseases of Children, vol. ii.; and Bateman's *Practical Synopsis of Cutaneous Diseases*.

PORROGONG, in *Geography*, a town of Bootan; 17 miles S. of Tassafudon.

PORROS, in *Surgery*, any fleshy or hard swelling; a scirrhus.

PORRUM, in *Botany*, an ancient Latin name. See ALLIUM.

PORSAN-

PORSANGER, or **POSANGUER**, in *Geography*, a town of Norwegian Lapland, situated on a bay of the North sea; 104 miles W. of Wardhuys. N. lat. 70° 50'.

PORSELON, or **PORSELONE**, a rich and commercial town of Siam, situated on a large river, which runs into the gulf of Siam, surrounded with fourteen bastions. N. lat. 17° 48'. E. long. 99° 46'.

PORSICA, in *Ancient Geography*, a town of Asia, in Mesopotamia, situated on the E. bank of the Euphrates, S.E. of Samofata.

PORSILE, **GIUSEPPE**, of Naples, in *Biography*, the son of Carlo Porfile, who composed the opera of "Nerone" for that city in 1686, appears to have been in the service of the emperor at Vienna in 1720. Apostolo Zeno speaks of his *bella musica* to "Spartaco," an opera written by the Abate Pasquini for the imperial court in 1726; between which period and 1735, he composed several dramas for the different theatres of Italy. His favour at Vienna, however, appears to have been durable, as he was employed there, in 1733, to set the oratorio of "Giuseppe Riconosciuto," by Metastasio, which Hasse publicly declared to be the finest music he had ever heard. We have never met with any of his productions; but his style is said, by others, to have been natural, and full of force and expression.

PORSON, **RICHARD**, a very celebrated Greek scholar, was born at East-Ruſton, in Norfolk, on Christmas-day, 1759. His father, Mr. Huggin Porson, who was in humble life, and the parish-clerk of East-Ruſton, laid the basis of his son's acquirements. He had taught him all the rules of common arithmetic, without the aid of book or slate, before he was nine years of age. His memory thus incessantly exercised, he acquired a talent of close and intense thinking, and such a power of arranging every operation that occupied his mind, as in time to render the most difficult problems easy of solution. He likewise learnt reading and writing at the same time. The father drew the form of the letter on a board, or on sand, and Richard was shewn how to imitate the impression. As soon, therefore, as he could speak, he could trace all the letters of the alphabet, and soon learnt the power of each. At nine years of age, he and his brother Thomas were sent to the village school, kept by Mr. Summers. This worthy man professed to teach nothing beyond English, writing, and arithmetic, with the first rudiments of the Latin language; but he did all that he professed, and under him Richard Porson acquired the talent of writing a most beautiful hand. He continued under this gentleman three years, during which, he every evening repeated to his father the lessons and the tasks of the day. He and his brother were now transferred to the care of the reverend Mr. Hewitt, who instructed them in classical learning. Richard soon became the topic of general conversation in the district, and before he had completed his fourteenth year, he had engaged the notice of all the gentlemen in the neighbourhood. He was, through the influence of Mr. Norris, sent to Eton in 1774, where he displayed such a superiority of intellect, such facility in the acquirement of his various lessons, and such a talent of being able to bring forward to his purpose all that he had ever read, that the upper boys took him into their society, and frequently imposed upon him their own exercises. He was looked up to as the almost never-failing resource in every difficulty; and in their frolics as well as tasks, Porson was their constant adviser and support. After the death of Mr. Norris he was supported at Eton by the liberality and kindness of some friends, who were unwilling that such talents as he possessed should be lost to the world for want of due culture. He was entered of Trinity college about the close of the year

1777; and in every branch of college study to which he applied himself, his course was so rapid, as to astonish every competent observer. By accident, he was first led to read mathematics, in which he might have surpassed the most of his contemporaries; but the prospect of a scholarship, which did not become vacant for a long time, induced him to devote his attention to the study of the classics. In this department of learning he soon acquired undisputed pre-eminence. He obtained the medal, and was elected fellow in 1781. In 1783 he took his degree of master of arts. In 1788 he determined to surrender his fellowship, though he had even then nothing to depend upon, but acquirements that are difficult to be brought to market, and are often, in a pecuniary point of view, very unprofitable to the owner. In 1791 his fellowship ceased, and he was thrown upon the world without a profession, his feelings wounded by mortifications which he had received, and with a constitution little qualified to encounter the bustle of the world. He was soon after this elected Greek professor at Cambridge, by an unanimous vote of the seven electors. The salary attached to this office was 40*l.* a-year only, still it was his earnest wish to have made the duties of it active and efficient; and he resolved, if he met with encouragement, to give an annual course of lectures in the college. For these lectures he had made preparations, in which he intended to elucidate the languages in general, to have shewn their relations, their differences, their near and remote connections, their changes, their structure, their principles of etymology, and their causes of corruption. The office, however, was regarded as a mere sinecure, and so those, in whose gift it was, intended it to remain, as they would not allow Mr. Porson rooms for the purpose of rendering it really efficient.

Three years after this he married: this lady unfortunately died in 1797, and from that time the health of the professor himself began to decline. An almost incessant spasmodic asthma, which was probably much increased by irregularity in his modes of life, interrupted him in every study to which he applied himself. Perhaps his sedentary habits were unfavourable to his course of general health, for few men had accustomed themselves to so much patient and continued toil. On the establishment of the London Institution, he was elected the principal librarian, an office which he did not hold very long, being seized, early in the month of September 1808, with an intermitting fever, which was followed on the 19th day of the same month by an apoplectic seizure, from which he partially recovered, but only to endure a second attack on the following day. He languished a few days, and then died in the 49th year of his age.

Such is the brief narrative of the life of this learned man. We shall now turn particularly to his literary labours, by which he has left an unfading reputation. These were commenced while he was an under-graduate, in 1785, by the republication of Xenophon's *Anabasis*, originally edited by the learned Hutchinson. He added many original notes, chiefly relating to MSS., of which Hutchinson was either ignorant, or had passed by in neglect. In 1790, a new edition of the work entitled "*Emendationes in Suidam et Hesychium et alios Lexicographos Græcos*," was published at the Clarendon press. To this the professor subjoined some critical notes, which were claimed only by the addition of the initials of the learned Grecian. In the course of the same year, Mr. Porson distinguished himself by his celebrated controversial work, which was the first that extended his reputation beyond the boundaries of the universities, and spread his fame through the whole of Europe. The work to which we allude was entitled letters to Mr. Archdeacon Travis, in answer to his defence of the three heavenly witnesses,

nesses, 1 John, v. 7. This, which was the first regular avowed publication, received the applause of Mr. Gibbon, who rejoiced to behold one of his own most imperative antagonists humbled to the dust, "by the most acute and accurate piece of criticism which has appeared since the days of Bentley." And the historian adds, that the "author's strictures are founded in argument, enriched with learning, and enlivened with wit, and his adversary neither deserves nor finds quarter at his hands." The writer in the Monthly Review, vol. v. of the New Series, says, Mr. Porson "has gone to the bottom of the subject; has furnished a critical repast for the biblical scholar; and has exhibited a cloud of witnesses against the three heavenly witnesses. He proves that the reading which he defends is the reading of all the Greek MSS., above an hundred and ten: of near thirty of the oldest Latin, of the two Syriac versions, of the Coptic, Arabic, Æthiopic, and Slavonic."

In 1793 he published a beautiful edition of Heyne's Virgil, to which he prefixed a short preface, disclaiming any other merit than that of a few conjectural criticisms. Mr. Porson has with great labour corrected Pauw's edition of Æschylus throughout, of which, very unaccountably, a surreptitious impression found its way to the press. In 1795 a beautiful edition of the seven tragedies was published by Foulis; and Schultz printed another in Germany, and added to it Mr. Porson's new readings, to which he prefixed a short introduction, replete with respect for the learning and talents of the English professor.

In 1797 appeared the Hecuba of Euripides, in one volume 8vo., with notes and a learned vindication. This was intended, in part, to try what success he was likely to meet with, if he published the other plays in the same way: two more accordingly made their appearance in succession: and he left, at his death, the Orestes ready for the press. As a proof of his great patience, we may add, that he had undertaken to make out, and copy, the almost obliterated manuscript of the Lexicon of Photius, which he had borrowed from the library of Trinity college. This he had with vast difficulty completed, when the beautiful copy that had cost him ten months of incessant toil, was burnt in the house of Mr. Perry, at Merton. The original, being an unique, and entrusted to him by his college, he carried with him wherever he went, and he was fortunately absent from Merton when the fire happened. Unruffled by the loss, he sat down without a murmur, and made a second copy in as beautiful a style as the first. "The principal qualities," says one of his biographers, "in this great man's mind, were his extraordinary acuteness of discernment, and solidity of judgment; and these, added to his intense application and stupendous memory, made him what the world, perhaps, never saw before, a complete critic, in the most honourable and extended sense of that appellation. His reading was immense: he was an excellent French scholar, but in his native language, in the Latin, and in the Greek, he was most familiarly and profoundly versed. He had, indeed, applied the knowledge which he had gained of the origin and structure of language in general, to all these dialects, if we may so express ourselves of the universal language; and had not his eminence in classical literature, by its uncommon lustre, obscured other attainments, he would doubtless have been considered as one of the first English scholars. In Greek, however, we have no hesitation in pronouncing him the very first, not merely of his own age, but of every other. In him were conspicuous boundless extent of reading, a most exact and well ordered memory; unwearied patience in unravelling the sense of an author, and exploring the perplexities of a MS.; perspicacity in discovering the corruptions of a text, and

acuteness, almost intuitive, in restoring the true reading. All this was tempered with a judgment which preserved him invariably from the rocks against which even the greatest of his critical predecessors have at some time or other split; we mean precipitation in determining that to be unsound, which after all had no defect; and rashness in applying remedies which only served to increase the disease. His character was manly and independent: he both cultivated and inculcated a love of freedom, and was, at all times, a strenuous supporter of the civil and religious liberties of his country."

On his death, his college claimed the body, in order to be deposited in the chapel of Trinity, near the ashes of Bentley, whom he so much resembled. It was accordingly removed, on the third of October, from London to Cambridge, where it was received, with every mark of respect, by the bishop of Bristol, the master of the college, the vice master, fellows, &c. Monthly Mag. vol. xxvi. Gent. Mag. for 1808. Monthly Review.

PORT, HAVEN, or *Harbour*, a commodious place situate on the sea-coast, or at the mouth of a river, with depth of water sufficient for ships of burden, and convenient bottom for anchorage; where vessels lie by to load or unload; screened from the wind, and safe from any enterprize of enemies; either by the disposition of the place, or by means of a mole, or dike, or the like; with a chain and light-house.

Ports are either *natural* or *artificial*.

PORTS, *Natural*, are those which Providence seems to have formed for the communication of commerce: or, where the natural figure of the land forming them, is such as contributes to the safety of the shipping therein, by sheltering the vessels from the fury of the sea; and this happens in various ways; such as a shoal lying off the harbour's entrance, which breaks the waves, and thereby keeps the water still within; or by the points of land, forming the harbour's mouth, stretching themselves so far into the sea, and coming so near to one another, that the surges are broke at their entrance; or by a narrow inlet that runs into the land for a considerable way, and where the shores near the entrance, receiving the shock of the waves, render the upper ports smooth enough to anchor in; of which kind are navigable rivers: or by a large deep bay, in which islands, or other obstructions, contribute to render a port secure for the riding of ships at anchor, &c.

The properties of a good harbour are, a sufficient depth of water for large ships to enter at any time, whether the tide be in or out; good offing, and an easy access out of all danger from the winds, and good anchoring ground; free entrance, without rock or sand-bank; the entrance not too wide, to be easily barred and defended upon occasion, and yet of sufficient extent to admit the entrance or departure of large ships without difficulty; not subject to overflow, and where ships may lie close to the quays; where the vessels are sheltered from all winds by the high mountains surrounding the harbour, and from whence there is an extended view of the sea; that the shipping therein be out of all danger, either from being set on fire, bombarded, or cannonaded from sea by the ships of an enemy; that it be furnished with a good light-house, and have variety of proper rings, ports, moorings, &c. in order to remove or secure the vessels contained therein; and lastly, that it have plenty of wood, and other materials for firing, besides hemp, iron, mariners, &c.

PORTS, *Artificial*, are those formed with piers, moles, or projectures into the sea; and when the moles or piers can be brought so close as to be shut up by sluices or gates, the harbour is then called a *basin*; but the inner part of a har-

bour, where the ships ride in still water, is usually called *the basin*.

All artificial ports of this kind are easily fortified by building on the moles or piers either batteries, redoubts, or forts, which command the entrance into the harbour. But the method of fortifying harbours, and also roads, in general depends on a variety of circumstances peculiar to each. See *MARINE FORTIFICATION*, *FORT*, and *BOOM*.

The English coasts are exceedingly thin of ports. France has the advantage of all other countries in the number and excellence of ports; that of Brest is the finest natural port in the world, as that of Dunkirk was lately the strongest artificial one.

The statutes 1 Eliz. cap. 11. and 13 & 14 Car. II. cap. 11. § 14. enable the crown by commission to ascertain the limits of ports and havens, and to assign proper wharfs and quays in each port, for the exclusive landing and lading of merchandize.

PORTS, Bar, Ports de barre, are such as can only be entered with the tide; as that of Goa.

PORTS, Close, are those within the body of a city; as those of Rhodes, of Venice, Amsterdam, Rochelle, Bayonne, and St. Jean de Luz.

PORT, Free, in *Commerce*, a port open and free for merchants of all nations to load and unload their vessels in, without paying any duties or customs.

Such are the ports of Genoa and Leghorn.

PORT, Free, is also used for a total exemption and franchise which any set of merchants enjoy, for goods imported into a state, or those of the growth of the country exported.

Such was the privilege the English enjoyed for several years after their discovery of the port of Archangel; and which was taken from them on account of the regicide in 1648.

PORTS, Cinque. See *CINQUE Ports*.

PORT is also sometimes used for the burden of a ship.

The capacity of a vessel is estimated in tons; each of which may contain about two thousand pounds weight of sea-water. When we say, a vessel is of the port or burden of a thousand tons, it is not meant, as some imagine, that it bears so many casks full of merchandize; but that the sea-water, which would be contained in the space which the capacity of the vessel possesses in the sea, weighs a thousand tons, which, at the rate of two thousand pounds each, is as much as to say, it bears a burden of two millions weight.

For the method of estimating this, see *BURDEN*.

PORT is also used for the palace of the grand signior, or emperor of the Turks.

PORT is also used for a strong wine brought from Oporto, or Port-a-Port in Portugal; whence its name. See *WINE*.

PORT of the Voice, in *Music*, the faculty and habit of making the shakes, passages, and diminutions, in which the beauty of a song, or piece of music, consists; and which the Italians comprehend under the terms *trilli*, *gruppi*, *straf-cini*.

PORT, among *Sailors*, denotes the larboard or left side of the ship; and is used, no doubt, to prevent any mistakes happening from the similarity of sounds in the words starboard and larboard, particularly when they relate to the helm, where a misapprehension might be attended with very dangerous consequences. Thus,

To port a helm, is to put the helm on the left side of the ship, that the ship may go to the right, or starboard.

The ship heels to port, denotes that she inclines or stoops to the larboard side.

Top the yard to port, is the order to make the larboard extremity of a yard higher than the other.

PORTS of a Ship. See *PORT-HOLES*.

PORT Abineau, in *Geography*, a harbour on the N. side of lake Erie.

PORT Allan, a harbour on the S. coast of Scotland, and W. side of Wigton bay. N. lat. $54^{\circ} 50'$. W. long. $4^{\circ} 24'$.

PORT Almeyda, a harbour on the coast of Africa, in the Indian sea. S. lat. $13^{\circ} 25'$.

PORT Althorp, a harbour on the N.W. coast of King George Third's Archipelago, between point Lucan and point Lavinia. N. lat. $58^{\circ} 11'$. Long. of the entrance $223^{\circ} 55' E$.

PORT Amherst, a harbour on the S. coast of Nova Scotia. N. lat. $43^{\circ} 32'$. W. long. $65^{\circ} 20'$.

PORT Angel, a harbour on the W. coast of Mexico, in midway between St. Pedro and Compostella, with a broad open bay, and good anchorage. N. lat. $13^{\circ} 32'$. W. long. $97^{\circ} 4'$.

PORT Anna Maria, a bay or harbour on the S. coast of Sir Henry Martin's island, in the Pacific ocean; easy of access and egress, with 24 fathoms of water at its entrance, in depth gradually decreasing to seven fathoms, within a quarter of a mile of its shore, with a fine sandy bottom; well guarded by the surrounding lands against the winds and sea in all directions, supplied by a stream of fine water; seven miles W. of port Marko.

PORT Antonio, a harbour on the N.E. coast of Jamaica. N. lat. $18^{\circ} 5'$. W. long. $76^{\circ} 5'$.

PORT Bainbridge, an inlet of the North Pacific ocean, extending about 20 miles northward into the W. coast of North America; its entrance is in N. lat. $59^{\circ} 55'$. E. long. $212^{\circ} 14'$.

PORT Banks, a harbour on the W. coast of North America, so called by Capt. Dixon. The land to the N. rises to a great height, and is covered with snow; eastward it is lower, and pines grow well. The prospect is pleasing and romantic. N. lat. $56^{\circ} 35'$. W. long. 135° .

PORT Baxwell, a harbour on the W. coast of North America. N. lat. $59^{\circ} 40'$. W. long. $149^{\circ} 40'$.

PORT Blanc, a harbour on the coast of Egypt, in the Red sea; 25 miles S.S.E. of Cossair.

PORT Bourbon, a sea-port on the S. coast of the island of Mauritius.

PORT Cabanos, a harbour on the N. coast of Cuba, E. of Florida bay.

PORT Camden, an inlet or branch from Prince Frederick's sound, extending about 20 miles south. N. lat. $56^{\circ} 55'$. Long. from the entrance $226^{\circ} 15' E$.

PORT Canan, a harbour on the S. coast of Scotland, and E. side of Glenluce bay. N. lat. $54^{\circ} 67'$. W. long. $4^{\circ} 30'$.

PORT Chalmers, a harbour on the W. coast of Montague island, in Prince William's sound. N. lat. $60^{\circ} 16'$. E. long. $213^{\circ} 22'$.

PORT Charles, a harbour on the E. coast of New Zealand, on the N. part of a peninsula, which bounds the river Thames eastward; six miles E. of cape Colville.

PORT Chatham, a bay or harbour on the E. coast of Greater Andaman island. N. lat. $11^{\circ} 41'$. E. long. $92^{\circ} 51'$.—Also, a harbour on the W. coast of North America, behind the island which forms cape Elizabeth, at the E. end of the entrance into Cook's inlet, and from that cape extends to a point in a direction N. 45, E. $5\frac{1}{2}$ miles; and from thence it terminates in an excellent harbour about two miles

long from N. to S., affording convenient and secure anchorage. N. lat. $59^{\circ} 14'$. E. long. $209^{\circ} 4'$.

PORT *Chaudiere*, a harbour on the S. coast of Hispaniola; 50 miles W. of St. Domingo.

PORT *Clarke*, a harbour on the W. side of Christian's sound, on the coast of Terra del Fuego; four miles N.N.E. of York Minster.

PORT *Conclusion*, a harbour on the E. coast of the southern extremity of King George Third's Archipelago, called so by Capt. Vancouver, on account of its being the last harbour which he examined on the coast of America. N. lat. $56^{\circ} 15'$. E. long. $225^{\circ} 37'$.

PORT *Cornwallis*, a harbour and settlement belonging to the English on the E. coast of the island of Andaman. The settlement was founded, in 1791, on an island called "Chatham," about two miles long, and half a mile broad; the southern extremity being separated from the larger Andaman island by a narrow channel, fordable at low water. N. lat. $13^{\circ} 20'$. E. long. $93^{\circ} 10'$.

PORT *de Conquel*, a harbour of France, on the peninsula of Quiberon. N. lat. $47^{\circ} 30'$. W. long. 3° .

PORT *Cox*, a bay on the W. coast of America; 60 miles S.E. of Nootka found.

PORT *Daniel*, a harbour in Chaleur bay. N. lat. $48^{\circ} 10'$. W. long. 65° .

PORT *Dauphin*, a bay on the E. coast of the island of Cape Breton. N. lat. $46^{\circ} 20'$. W. long. $60^{\circ} 25'$.

PORT *Desire*. See DESIRE.

PORT *Dick*, a harbour on the W. coast of North America. N. lat. $59^{\circ} 13'$. E. long. $209^{\circ} 45'$.

PORT *Discovery*, a harbour on the W. coast of North America, in the gulf of Georgia, E. of New Dungeness, so called from the ship of Vancouver denominated Discovery, which anchored here in May 1792. The entrance of the port is in N. lat. $48^{\circ} 7'$. E. long. $237^{\circ} 29'$.

PORT *Egmont*. See EGMONT.

PORT *d'Envaux*, a town of France, in the department of the Lower Charente; six miles N. of Saintes. N. lat. $49^{\circ} 51'$. W. long. $0^{\circ} 35'$.

PORT *d'Espagne*, a small sea-port in the island of Trinidad.

PORT *Effington*, a harbour of the North Pacific ocean, on the coast of New Cornwall, with a depth of water from seven to nine fathoms. N. lat. $54^{\circ} 14'$. E. long. $230^{\circ} 12'$.

PORT *Etches*, a bay or harbour on the S.W. of Hinchinbrook island, and the entrance of Prince William's sound, where the Russians have a factory; guarded by an armed galliot placed on the shore. N. lat. $60^{\circ} 21'$. E. long. $213^{\circ} 56'$.

PORT *Famine*. See FAMINE.

PORT *Fidalgo*, an inlet on the west coast of North America, extending about 20 miles from the north-east part of Prince William's sound, so called by captain Vancouver in honour of signior Fidalgo, a Spanish officer, who examined the neighbouring coast in the year 1790. N. lat. $60^{\circ} 49'$. Long. of entrance $213^{\circ} 57'$ E.

PORT *Float*, a bay and village of Scotland, in the county of Wigton; 7 miles S. of Stranrawer.

PORT *Français*, a harbour on the coast of Brasil. S. lat. 7° .

PORT *de Français*. See FRANÇAIS.

PORT *Fuego*, a sea-port on the west coast of the island of Luçon. N. lat. $14^{\circ} 14'$. E. long. $120^{\circ} 30'$.

PORT *Galeres*, a port on the south coast of the island of Samos. N. lat. $37^{\circ} 44'$. W. long. $26^{\circ} 54'$.

PORT *Gallant*, a harbour in the straits of Magellan, on

the coast of Patagonia, within Fortescue bay. See *Cape Gallant*.

PORT *Gardner*, a harbour on the east coast of Whidby's island, in the gulf of Georgia. N. lat. $48^{\circ} 2'$. E. long. $237^{\circ} 47'$.

PORT *Glasgow*. See GLASGOW.

PORT *Gore*, a bay of the North Pacific ocean, on the west coast of North America. N. lat. $59^{\circ} 10'$. W. long. $150^{\circ} 20'$.

PORT *Hannah*, a bay on the west coast of North America; 40 miles S.E. of Nootka found.

PORT *Hawkebury*, a bay on the west coast of North America, at the north entrance of the straits into Juan de Fuca. N. lat. $48^{\circ} 35'$. W. long. $124^{\circ} 40'$.

PORT *Holland*, a harbour on the coast of Patagonia, in the straits of Magellan, with good anchorage. N. lat. $53^{\circ} 57'$. W. long. $72^{\circ} 34'$.

PORT *Hood*, a bay on the west coast of Cape Breton. N. lat. 46° . W. long. $61^{\circ} 16'$.

PORT *Houghton*, a harbour on the west coast of North America, between point Hobart and point Walpole. It is bounded by lofty mountains, and from their base extends a small border of low land, forming the shores of the harbour.

PORT *Hubert*, a bay on the south coast of Nova Scotia. N. lat. $34^{\circ} 53'$. W. long. $64^{\circ} 55'$.

PORT *Jackson*. See JACKSON and *New Holland*. See also *BOTANY Bay*.

PORT *Ingraham*, a harbour on one of the Queen Charlotte's islands, in the North Pacific ocean, said to be a good port in which to winter. N. lat. $53^{\circ} 37'$. W. long. $133^{\circ} 18'$.

PORT *Inbambane*, a harbour on the coast of Africa, in the Indian sea. S. lat. $23^{\circ} 10'$.

PORT *John*, a good harbour on the west coast of King's island, in the North Pacific ocean. N. lat. $52^{\circ} 7'$. E. long. $232^{\circ} 10'$.

PORT *Joli*, a town of Canada, on the right bank of the St. Lawrence. N. lat. $47^{\circ} 15'$. W. long. $70^{\circ} 10'$.

PORT *Isaac*, a haven of England, on the north-west coast of the county of Cornwall. N. lat. $50^{\circ} 37'$. W. long. $4^{\circ} 16'$.

PORT *Kisfit*, a harbour in the Red sea, on the coast of Nubia, near the mouth of the Farat.

PORT *Lethen*, a sea-port on the east coast of Scotland, in the county of Kincardine; 6 miles S. of Aberdeen. N. lat. $57^{\circ} 1'$. W. long. $2^{\circ} 5'$.

PORT *Loquez*, a bay on the east coast of Madagascar. S. lat. $13^{\circ} 25'$. E. long. $50^{\circ} 20'$.

PORT *Louis*, a sea-port town on the west coast of the island of Guadaloupe. N. lat. $16^{\circ} 38'$. W. long. $61^{\circ} 33'$.

PORT *Louis*, a sea-port and principal town of the island of Mauritius, in which the governor and council reside. It is situated on the west side of the island, in a valley surrounded with high mountains, and contains above 500 houses, built of wood, and consisting of one story with garrets; though by the scarcity of wood, and the difficulty of procuring it from a distance, stone is now introduced. The town is irregular in the arrangement of its houses, but the quays are very commodious both for loading and unloading vessels. Water is conveyed to the town from a river at the distance of about a league, by a canal to the foot of a mountain, where is a large reservoir that supplies those who bring barrels in their boats to fetch it. Towards the middle of the town there is a large space, surrounded by a high stone wall, within which are the buildings assigned to the slaves of the company, as well as public stables, &c.

At the extremity of the valley, in which the town is situated, there is a space of ground, called the "Field of Mars," in which the military perform their exercise: here are also a rope-walk, and a promenade for the inhabitants. The port is not large; its entrance is narrow, and defended by two opposite batteries. About two or three miles to the west of the town is a considerable river, called "Le Grand Riviere," from which the town and harbour are supplied with water, and at the mouth of it is a powder-mill. On the summit of a high mountain is a guard-house, from whence a flag is hoisted, whenever a vessel is discovered in the offing. There is also another at a higher elevation, which serves as a signal to the inhabitants of the country, and by means of which intelligence is speedily communicated through the whole island. At the entrance of the harbour is an island, called "Isle des Tonnières," on which are several redoubts and batteries, well furnished with heavy artillery for defending the town. S. lat. $20^{\circ} 10'$. E. long. $57^{\circ} 32'$.

PORT *Louis*, or *Blavet*, a town of France, in the department of the Morbihan, at the mouth of the Blavet, situated at the extremity of a peninsula, defended by a citadel, surrounded by the sea and rocks. The road is spacious, and the harbour secure. It is guarded by other fortifications besides the citadel, and its commerce is considerable; 3 miles S. of L'Orient. N. lat. $47^{\circ} 43'$. W. long. $3^{\circ} 16'$.

PORT *Mahon*, a sea-port town of the island of Minorca, of which it is the present capital. It owes its name and foundation to Mago, erroneously called Magan and Mahon, the Carthaginian general. This town is situated on rocks, on the left bank of the port, on entering from the sea, which it commands; and this elevated situation affords it the benefit of a pure and healthy air. The houses have in general no other foundation than the rocks, which are undermined, or rendered hollow by the water, and which in course of time will render their situation dangerous. In general they are constructed with taste; many of them are terminated in the Italian style by a terrace, and almost all of them have a cistern. The parish church and three convents are tolerably well built, though without any exterior ornament. The hospital is large enough to accommodate 60 invalids; and there are some private schools for both sexes. The streets are narrow, rough, uneven, and badly paved with flints. Mahon was formerly surrounded with walls, supposed to have been erected by the Moors; but of these there is nothing left but one of the gates. The place of arms is square, large, and handsome; having on one side a barrack, capable of containing 1200 soldiers; and the other three sides are surrounded with houses. The alameda is an alley of trees, and this is the only promenade. The port has been long celebrated; and it is reckoned one of the finest, safest, and most convenient in the Mediterranean: a large fleet of ships of the line can enter and lie at anchor in it very conveniently. Hence has arisen the proverb: June, July, August, and port Mahon, are the best ports in the Mediterranean. At the entrance there are some shoals, but within the ships are sheltered from all winds. It is near $1\frac{1}{2}$ league in extent, and contains four islands: viz. the King's isle, where is a neat hospital built by the English; the isle of Quarantine; the isle of Lazaret; and the isle Redonda, which is a circular mass of rocks. Stocks for ship-building are established on the right bank of the port. The Cabo Mola, or promontory, situated on the east, at the entrance into the mouth of the port, is very high, and joins the island by a narrow mass of sand. At a short distance from Cape Mola stands the signal-tower, to correspond with mount Toro, which is connected with other points. The

signals are conveyed during the night by fires, and in the day-time by flags. Fort St. Philip was famous in the maritime wars of the last century. This fortress occupied a space of about a league in circumference; but the whole was blown up and destroyed, by order of the Spanish government, in 1805. There is nothing left in the centre but some small edifices. N. lat. $39^{\circ} 52'$. E. long. $4^{\circ} 52'$.

PORT *Mahesbury*, a bay or harbour on the west coast of an island in the North Pacific ocean, and southern part of Chatham strait. N. lat. $56^{\circ} 17'$. Long. of the entr. $225^{\circ} 59' E$.

PORT *Mangarin*, a harbour on the south coast of the island of Mindoro. N. lat. $12^{\circ} 25'$. E. long. $121^{\circ} 12'$.

PORT *Margot*, a town of Hispaniola; 14 miles E.S.E. of Port Paix.

PORT *Maria*, a bay on the north coast of Jamaica.

PORT *Mariel*, a harbour on the north coast of Cuba.

PORT *Marquis*, a harbour on the west coast of Mexico; 3 miles E. of Acapulco.

PORT *Mary*, a bay on the west coast of King George Third's Archipelago. N. lat. $57^{\circ} 11'$. E. long. $224^{\circ} 29'$.

PORT *Mathanon*, a harbour on the south-east coast of the island of Cuba, between Cape Mayzi and Cape Cruz.

PORT *Maurice*, a bay on the south-east coast of Terra del Fuego, south-west of Cape St. Diego. N. lat. $54^{\circ} 44'$. W. long. $66^{\circ} 15'$.

PORT *Morant*, a bay on the south coast of the island of Jamaica, near the east end of the island. N. lat. $17^{\circ} 54'$. W. long. $76^{\circ} 2'$.

PORT *Mulgrave*. See ADMIRALTY Bay.

PORT *Nevile*, a bay in Johnstone's straits, on the coast of North America. N. lat. $50^{\circ} 31'$. E. long. $234'$.

PORT *Nockie*, a harbour of Scotland, on the coast of Bamffshire. N. lat. $57^{\circ} 40'$. W. long. $2^{\circ} 47'$.

PORT *Oliver*, or *Port Yero*, a sea-port on the south-east coast of the island of Metelin. See MITYLENE.

PORT *Orchard*, a bay or harbour within ADMIRALTY Inlet; which see. N. lat. $47^{\circ} 39'$. E. long. $237^{\circ} 36'$.

PORT *Paix*, a town of the island of Hispaniola, on the north shore, with a good harbour, and in the midst of the most healthy territory in the island. N. lat. $19^{\circ} 55'$. W. long. $73^{\circ} 12'$.

PORT *Palliser*, a harbour on the north-east coast of Kerguelen's land, in the Southern Indian ocean. S. lat. $49^{\circ} 3'$. E. long. $69^{\circ} 37'$.

PORT *Pasquet*, a harbour on the south-west side of the island of Majorca.

PORT *Penn*, a town of America, in the state of Delaware, on the Delaware river; 30 miles below Philadelphia.

PORT *Plate*, a harbour on the N. coast of Hispaniola. N. lat. $19^{\circ} 45'$. W. long. $71^{\circ} 25'$.

PORT *Praslin*, a bay on the N. coast of New Georgia, on the land of Arfacides, discovered by M. Surville in 1769. S. lat. $7^{\circ} 25'$. Long. of the entr. $154^{\circ} 50' E$.

PORT *au Prince*, a sea-port, with a jurisdiction of the same name, at the head of the great bay or bight of Leogane, on the W. coast of Hispaniola, or St. Domingo. This town, in time of peace, has been the seat of the French government, and a place of considerable trade. The adjacent country produces cotton, indigo, sugar, and coffee. In 1770 a great part of the town was destroyed by an earthquake; in 1791 it was very much damaged by fire; and in 1794 it was taken by the English. Its situation is low and marshy, and of course insalubrious. The hills that surround it, and that command the town and harbour, and the intervening valleys are very fertile. To the E. lies the fruitful plain of Cul de Sac, 30 or 40 miles long, and

9 broad, containing about 150 sugar plantations, most of which may be watered by canals. Port au Prince is seven leagues E. by N. from the town of Leogane. N. lat. $18^{\circ} 35'$. W. long. $73^{\circ} 10'$.

PORT *du Prince*, a town on the northern coast of the island of Cuba, with a good harbour, situated in a large meadow, where the Spaniards feed numerous herds of cattle.

PORT *Protection*, a harbour on the W. coast of North America, at the N.W. extremity of the Prince of Wales's Archipelago, so called by Capt. Vancouver, on account of its affording him an asylum after a violent storm, Sept. 8, 1793. The shores are in many places steep and rocky, and are covered with impenetrable forests of pine and other trees, which afforded several streams of fresh water. N. lat. $56^{\circ} 20'$. E. long. of the entrance $226^{\circ} 35'$.

PORT *Raphiti*, or *Raffii*, a harbour of the Ægean sea, on the N.E. coast of Attica, anciently the port of "Prasiæ." It is described as a most safe, commodious, and delightful harbour; almost surrounded with vallies, which terminate in mountains; the intervening slopes being covered with pine-trees and verdure. The bay is divided by a sharp point of land, and near its mouth are two islands, or rocks; on the summit of one of which, whose base is about a mile in circumference, is a large colossal statue in a fitting posture, with the arms and legs broken off, supposed to have been about twelve feet high before it was mutilated. On the other island is another figure, representing a female. These statues are supposed to represent Apollo and Diana, and were probably placed as guides to seamen by day, or with lights at night. N. lat. $37^{\circ} 52'$. E. long. $24^{\circ} 1'$.

PORT *Razoir*, a harbour on the S.W. coast of Nova Scotia.

PORT *Resolution*, a harbour on the N. side of the most easterly point of the island of Tanna, in the Pacific ocean. Although it is only a small creek, it is very convenient for taking in both wood and water. S. lat. $19^{\circ} 32'$. E. long. $169^{\circ} 35'$.

PORT *Rosemary*, a bay on the S.E. of Nova Scotia, in which the town of Shelburn is built. N. lat. $43^{\circ} 40'$. W. long. $65^{\circ} 13'$.

PORT *Royal Island*, an island in Port Royal entrance, near the coast of South Carolina, separated from the main land on the W. by Broad river; about twelve miles long, and one wide. The principal town is Beaufort. It has an excellent harbour, sufficient to contain the largest fleet in the world. N. lat. $32^{\circ} 12'$.

PORT *Royal*, or *Porto Escondendo*, a small island and harbour in the bay of Campeachy, near the coast of Yucatan. N. lat. $18^{\circ} 22'$. W. long. $92^{\circ} 36'$.

PORT *Royal*, a sea-port of the county of Surry, in the island of Jamaica, situated on the S. side of the island, on a narrow neck of land; in which a thousand sail of ships could anchor with the greatest convenience and safety. Port Royal was once of the greatest wealth and importance in the West Indies; but it is now reduced by repeated calamities to three streets, a few lanes, and about 200 houses. It contains, however, the royal navy-yard, for hewing down and refitting the king's ships; the navy-hospital, and barracks for a regiment of soldiers. The fortifications are kept in excellent repair; 20 miles S.W. of Kingston. N. lat. $17^{\circ} 50'$. W. long. 77° .

PORT *Royal*, a post-town of America, in Virginia, on the S. bank of Rappahannock river, in Caroline county. It is laid out on a regular plan, and contains about 200 brick houses, of handsome appearance, with three churches, for Episcopalians, Presbyterians, and Methodists; 22 miles

S.E. of Fredericksburg. N. lat. $38^{\circ} 13'$. W. long. $77^{\circ} 34'$. —Also, a town and harbour in the island of Martinico, one of the chief places in the island. N. lat. $14^{\circ} 38'$. W. long. $61^{\circ} 9'$.

PORT *Royal*, or *Annapolis*. See ANNAPOLIS.

PORT *Royal Harbour*, a port on the S. coast of the island of Ruatan.

PORT *St. Antonio*, a harbour on the S. coast of the island of Stalimenc.

PORT *St. Felice*, a harbour on the W. coast of Madagascar. S. lat. $22^{\circ} 15'$.

PORT *St. James*, a bay on the W. coast of Madagascar. S. lat. $21^{\circ} 55'$. E. long. $47^{\circ} 4'$.

PORT *St. Juan*, a bay or harbour on the N.W. coast of the island of Quadra and Vancouver, at the entrance of the strait of Juan de Fuca. N. lat. $48^{\circ} 32'$. E. long. $235^{\circ} 52'$.

PORT *St. John*, a small town in the province of Nicaragua, in New Spain, at the mouth of a river on the North Pacific ocean; the harbour is safe and capacious, and is the sea-port of the city of Leon, 30 miles S.E. of it. N. lat. $12^{\circ} 10'$. W. long. $87^{\circ} 38'$.

PORT *St. Julian*, a harbour of the Atlantic, on the E. coast of Patagonia, discovered by Magellan, in April 1520. S. lat. $49^{\circ} 10'$. W. long. $68^{\circ} 44'$.

PORT *Sainte-Marie*, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Agen, on the Garonne; 10 miles W. of Agen. The place contains 2805, and the canton 12,643 inhabitants, on a territory of $147\frac{1}{2}$ kilometres, in 17 communes.

PORT *St. Mary*, a port on the N.W. coast of the island of Paros. N. lat. $37^{\circ} 8'$. E. long. $25^{\circ} 18'$.

PORT *St. Pere*, a town of France, in the department of the Lower Loire; nine miles S.W. of Nantes.

PORT *Salut*, a sea-port on the S. coast of the island of Hispaniola; 16 miles S.W. of Les Cayes.

PORT *Sandwich*, a harbour of the island of Mallicollo, in the South Pacific ocean. S. lat. $16^{\circ} 25'$. E. long. $167^{\circ} 57'$.

PORT *sur-Saone*, a town of France, in the department of the Upper Saone, and chief place of a canton, in the district of Vesoul; six miles N.W. of Vesoul. The place contains 1914, and the canton 9078 inhabitants, on a territory of 180 kilometres, in 18 communes.

PORT *Sepsila*, a harbour on the N. coast of the island Patino, about a mile E. of La Scala.

PORT *Serivan*, a harbour on the coast of the isthmus of Darien, with a rocky dangerous entrance, but safe within, with good anchorage in a sandy bottom.

PORT *Seaton*, a sea-port of Scotland, on the Frith of Forth; eight miles E. of Edinburgh. N. lat. $55^{\circ} 58'$. W. long. $2^{\circ} 55'$.

PORT *Seitan*, a port on the N. coast of the island of Samos. N. lat. $37^{\circ} 49'$. E. long. $26^{\circ} 40'$.

PORT *Selanguin*, a harbour on the W. coast of the island of Luçon. N. lat. $14^{\circ} 50'$. E. long. $120^{\circ} 10'$.

PORT *Shimene*, a harbour on the N. coast of the island of St. John, in the gulf of St. Laurence.

PORT *Skerry bay*, a harbour on the N. coast of Scotland. N. lat. $58^{\circ} 31'$. W. long. $3^{\circ} 47'$.

PORT *Snettisham*, a harbour on the W. coast of North America, in Stephens's Passage, between point Styleman, and point Hanmer.

PORT *Solidad*, a port on one of the Falkland islands, with a fortress erected by M. Bougainville, and called by him "St. Louis."

PORT *Stephens*, a bay on the E. coast of New Holland. S. lat.

S. lat. $32^{\circ} 40'$. W. long. $207^{\circ} 51'$.—Also, a harbour on the S. coast of Pitt's Archipelago, in the North Pacific ocean. N. lat. $33^{\circ} 28'$. E. long. $230^{\circ} 21'$.

PORT *Stewart*, a harbour on the W. coast of North America, surveyed by Mr. Stewart, one of Vancouver's mates. N. lat. $55^{\circ} 38'$. E. long. $228^{\circ} 4'$.

PORT *Subec*, a harbour on the W. coast of Luçon. N. lat. $14^{\circ} 50'$. E. long. $120^{\circ} 20'$.

PORT *Susan*, a harbour on the W. coast of North America, in the gulf of Georgia, E. of Whidby's island. N. lat. $48^{\circ} 5'$. E. long. $237^{\circ} 55'$.

PORT *Taytay*, a harbour on the E. coast of the island of Paraguay. N. lat. $10^{\circ} 35'$. E. long. $119^{\circ} 35'$.

PORT *Thouloufe*, a harbour on the S. coast of the island of Cape Breton.

PORT *Tibori*, a sea-port town on the S.W. coast of the island of Negropont. N. lat. $38^{\circ} 17'$. E. long. $27^{\circ} 10'$.

PORT *Tobacco*, a post-town of America, in Maryland, and capital of Charles county, situated a little above the confluence of two small streams, which form the creek of its name, that empties through the N. bank of the Potowmac, at Thomas's Point, about four miles below the town. It contains about 80 houses, and a large episcopal church; and also a warehouse for the inspection of tobacco. Near it are the celebrated cold waters of Mount Misery; it is 52 miles S.W. of Annapolis.

PORT *Towan*, a small bay on the N.W. coast of Cornwall; 12 miles N.W. of St. Ives.

PORT *Townshend*, a harbour in the gulf of Georgia, on the W. coast of North America, discovered by Vancouver in 1792. N. lat. $48^{\circ} 3'$. E. long. $237^{\circ} 31'$.

PORT *de la Trinidad*, a bay of the North Pacific ocean, on the W. coast of North America.

PORT *Ucab*, a harbour on the W. coast of North America. N. lat. $52^{\circ} 25'$.

PORT *Velas*, or *Velasco*, a harbour on the coast of California. N. lat. $28^{\circ} 13'$.

PORT *Vendre*, a town of France, in the department of the Eastern Pyrenées, with a small harbour on the Mediterranean, defended by two forts; deriving its name from a temple consecrated to the goddess Venus; 17 miles E. of Ceret. N. lat. $42^{\circ} 31'$. E. long. $3^{\circ} 12'$.

PORT *Vinegora*, or *Round Port*, a bay on the N. coast of the island of Madagascar. S. lat. $13^{\circ} 30'$. E. long. $53^{\circ} 44'$.

PORT *Wells*, a harbour or inlet on the N.W. part of Prince William's sound, on the W. coast of North America, from N. to S. about 10 miles in length, and 3 in its medial breadth. N. lat. $60^{\circ} 59'$. E. long. of the entr. $202^{\circ} 30'$.

PORT *Yarrook*, a harbour of Scotland, on the W. side of Wigton bay. N. lat. $54^{\circ} 49'$. W. long. $4^{\circ} 24'$.

PORTA, in *Anatomy*. See PORTARUM *Vena*, and LIVER.

PORTA, SIMON, in *Biography*, a celebrated Peripatetic philosopher in the sixteenth century, was born at Naples in the year 1496. He studied under Pomponazzi at Pisa, (see his article,) whose sentiments he adopted on the subject of the immortality of the soul. He became a lecturer in different Italian cities, and was nominated professor of philosophy at Pisa in the year 1546, where he explained the writings of Aristotle to crowded auditories, with profound learning and great applause. In 1552 he returned to his native city, where he died in 1554, at the age of 58. He was author of various works in moral philosophy, which were collected and published at Florence a short time before his death. The titles of these are given in the General Biography, to which our readers are referred.

PORTA, GIAMBATISTA, a Neapolitan gentleman, born about the year 1540. At a very early age he applied himself to the study of nature, and so great was his zeal for the advancement of knowledge, that he assembled a kind of academy in his house named *de' Secreti*, to which no one was admitted who had not made some useful discovery in philosophy or medicine. He likewise travelled for improvement, and became acquainted with the famous Fra. Paolo, from whom he acquired much valuable information. At Rome he was admitted into the academy de' Lincei. He travelled throughout Italy, into France and Spain, visiting all the libraries and learned men, and conversing with artists on matters relative to their several professions. His publications widely extended his fame, and Peiresc, when he visited Naples, about the end of the sixteenth century, held frequent conversations with Porta, and his brother, also a man of learning, and examined with attention the various curiosities of their museum. He was accused of unlawful superstitions, and was obliged to appear in person at the court of Rome to answer the accusation. He died at Naples in 1615, much regretted as one of the most acute geniuses of the age; his various talents were, however, joined with no inconsiderable portion of credulity and extravagance. His earliest work was entitled "*Magia Naturalis*," first printed in four books in 1538, which he afterwards augmented to twenty books. It has been frequently printed and translated into various languages. His work entitled "*Phytognomica*," in 1588, is an elaborate attempt to detect the qualities of plants by their resemblances to animals and their parts. One of his most fanciful works is entitled "*De Humana Physiognomia*," in which he professes to teach the art of discovering all the propensities of the human mind from the countenance, and of correcting them by suitable remedies. To this he added a "*Physiognomia Cœlestia*," treating upon the influence of the planets and constellations upon the manners and constitution, on which he supposes the bodily temperament to exert a greater effect. His work "*De Æris Transmutationibus*," gives an account of all that was then known of meteorological phenomena. His mathematical works obtained for him a still higher reputation than his other pieces; the principal of these were "*Elementa Curvilinea*," and "*De Refractione Optices*." In optics he was a great improver, if he does not merit the higher rank of a discoverer. The theory of light is much indebted to his labours; he was probably the first who fully satisfied himself that vision is performed by the intromission of something into the eye, and not by the visual rays proceeding from it. He invented the *camera obscura*, and applied it to the action of the human eye, though he suspected that the crystalline lens, and not the retina, was the seat of vision. He attributes to refraction the colours of the rainbow, but does not suppose it to be refraction in single drops, but of the whole mass of the falling rain. He wrote a curious work "*De occultis literarum notis*," in which he gives a great number of modes of secret writing. He is said to have composed comedies and tragedies, but those attributed to him have not yielded any addition to his fame. Priestley's Optics. Gen. Biog.

PORTA, BACCIO DELLA, called *Fra. Bartolommeo di San Marco*. (See BACCIO.) In addition to what is there inserted, we shall give M. Fuseli's judicious characteristic of this great artist, whose real surname has unfortunately escaped from the records of history. The appellation of Baccio is merely a vulgar diminutive of Bartolommeo, and that of della Porta was attached to him in consequence of his having his abode near one of the gates of Florence. When he afterwards took the sacerdotal habit of the Dominican

minican convent of St. Marco, he obtained that cognomen by which he is best, and indeed universally known, Fra. Bartolommeo di St. Marco; and sometimes is simply called by authors 'Il Frate.' "He studied under Cosimo Roselli, but soon grew enamoured of the grand chiaro-scuro of Lionardo da Vinci, and strove to emulate it. His progress was rapid, and he became the instructor of Raphael in colour, who gave him lessons in perspective. In imitation of him, Baccio aimed at uniting gracefulness with grandeur of form. The composition of his sacred subjects, and he painted little else, is the usual one of his time; which adhered to Raphael himself, and was not dismissed by the Florentine school before the epoch of Pontormo: but he disguised its formality by the introduction of architecture and majestic scenery. To repel the invidious charge of incapacity for large proportions, he produced the sublime figure of St. Marc, which alone fills an ample pannel, and is now among the spoils of the Louvre. His St. Sebastian, for skill in the naked, and energy of colour, obtained every suffrage of artists and of critics, but unfortunately became such a favourite with the female visitants of the chapel, that the monks thought proper, first to remove the picture to a more private place, and afterwards to sell and send it to France. In drapery he may be considered as an inventor; no artist of his school formed it with equal breadth or dignity, or so natural and expressive of the limits; and if he were the constructor, he was certainly not the slave of the layman." One work of his, of prodigious grandeur and beauty, is unnoticed by our author, viz. the Assumption of the Virgin, at Lucca. Its situation being retired, this picture is little known to travellers, though it is one of the most sublime productions of the pencil. Mr. West, the president of the Royal Academy, has in his possession a considerable part of the Studies mentioned by Vasari as having been left to his scholar, a nun of St. Catherine at Florence; and among them several drawings for this picture and its various parts. They are accompanied by about 200 drawings of figures, draperies, and limbs; studied from nature with great care and taste, and exhibit the industry and uncommon zeal with which he laid the basis of his justly acquired fame.

PORTA, COSTANZO, of Cremona, a disciple of Willaert, and fellow-student with Zarlino. He was at first maestro di cappella at Padua, next at Osimo, in the March of Ancona; then at Ravenna; and lastly, at Loretto; where he died in 1601. He was author of eighteen different works for the church, full of elaborate and curious compositions, which have been always sought and admired by masters, and collectors of learned music. This author seems not only to have vanquished all the difficult contrivances for which John Okenheim, Jusquin del Prato, and Adrian Willaert, from whose school he sprung, were celebrated, but considerably augmented their number: for, as orators, lawyers, and commentators have the art of twisting and subverting words to any meaning that favours their cause or hypothesis, so Costanzo Porta had equal power over any series of musical notes in a canon or fugue; which he could not only work in *recte et retro*, but invert, augment, diminish, divide, or subdivide, at his pleasure. In this faculty he very much resembled our Tallis, his contemporary. He began to flourish towards the latter end of the reign of Henry VIII. as did Tallis. According to Draudius, his five-part motets were published at Venice in 1546; and between that period and 1599, the rest of his works were published, either by himself or scholars, of whom he had a great number; particularly Lodovico Balbo, who flourished about 1578, and Giacomo Antonio Piccioli, 1588, both voluminous composers,

in their master's artificial and elaborate style, and consequently great canonists.

A composition by Costanzo Porta, in seven parts, is inserted in Burney's General History of Music, vol. iii. p. 227, taken from the author's fifty-two motets, in four, five, six, seven, and eight vocal parts, printed in 1588, while he was maestro di cappella of the holy church of Loretto; it consists of four parts in canon, two *per moto ritto*, and two *per moto contrario*, while the other three are in free fugue. Though long, it is so curious, and constructed with so much art, that it is exhibited as an example of that scientific species of writing, by which alone the abilities of a contrapuntist were measured in the sixteenth century, when there were no musical dramas, or full pieces for instruments, and but few single songs, or solos of any kind, to exercise genius and invention. Masses and motets for the church, and madrigals for the chamber, in three, four, five, six, and more parts, comprised almost all the music that was then composed.

PORTA, GIOVANNI, of Venice, first appeared as an opera composer in that city in 1716. His favour in his native place must have been very considerable; as we find in the catalogue of musical dramas performed in Venice in the beginning of the last century, twelve composed by Porta.

PORTA *Augusta*, in *Ancient Geography*, a town of Spain, in the country of the Vaccæi, between Viminatum and Antraca. Ptolemy.

PORTA, *La*, in *Geography*, a town of the island of Corfica, and capital of a district; 22 miles 'S.S.W. of Bastia. N. lat. 42° 18'. E. long. 9° 30'.

PORTA *Canonne*, a town of Naples, in the province of Capitanata; 8 miles S. of Termola.

PORTA *Maria*, lies in the N.E. part of the island of Jamaica, S.E. from Gallina point.

PORTA *Port*, lies on the N.W. side of the island of Newfoundland, having its S. entrance 10 or 12 leagues from Cape St. George.

PORTABLE, something easy of carriage.

PORTABLE *Barometer*. See BAROMETER.

PORTACRA, KARA-SOU, in *Ancient Geography*, a town in the interior of the Tauric Chersonesus, placed by Ptolemy 50' W. of Cimmericum.

PORTADOWN, in *Geography*, a post-town of the county of Armagh, Ireland, situated on the river Bann, over which it has a stone bridge, and noted for extensive business in the linen manufacture. It is 65½ miles N. by W. from Dublin.

PORTÆ AMANICÆ, in *Ancient Geography*, a defile of mount Amanus, at the eastern extremity of the Mediterranean sea, which, according to Ptolemy, separated between Cilicia and Syria. Here was the passage from the gulf of Issus into Cilicia, and the scene of two famous battles, one near Issus between Darius and Alexander, in which the latter was victorious, and another between Septimius Severus and Pescennius Niger, in which the latter was vanquished.

PORTÆ, or *Pyle ad Helos*, a defile of Arcadia, upon the route from Megalopolis to the canton of Menale. On the left of this defile was a wood consecrated to Bonus Deus, and at a small distance was the tomb of Aristodemus, who had usurped the sovereign power at Megalopolis, and who possessed many excellent qualities under the denomination of a tyrant. Minerva, the inventress, had also a temple near this place. On the right was a place consecrated to Boreas, to whom the Megalopolitans offered sacrifices as a god. At no great distance were also the burying-place of Amphiar-

raus, and a temple of Ceres of Helos, accessible only to females.

PORTAFERRY, in *Geography*, a post-town of the county of Down, Ireland, situated in the barony of Ardes, which is in a great measure separated by Strangford lough from the rest of the county. Portaferry is on one side of the channel by which this extensive lough is connected with the sea, and there is a ferry from it to the town of Strangford on the other side, from which it derived its name. It is 80 miles N.N.E. from Dublin, and six E. from Downpatrick.

PORTAGE, in *Commerce*, denotes money paid for the wages of sailors, while in port.

PORTAGE, in *Geography*, a county in the state of Ohio, containing, in 1810, 9 towns and 2995 inhabitants.

PORTAGE River, a river of America, which runs into lake Erie, N. lat. $41^{\circ} 55'$. W. long. $82^{\circ} 42'$.

PORTAGE, Le Grand, leads from the N.E. end of lake Superior, in Upper Canada, to a chain of smaller lakes, on the communication to the north-western trading ports.

PORTAGE Point, on the E. coast of New Brunswick, and in the S.W. part of the gulf of St. Lawrence, forms the N. limit of Miramichi bay, as Point Ecoumenac does the S.

PORTAIGUILLE, in *Surgery*, the handle of a tentaculum.

PORTAIL, in *Architecture*, the face or frontispiece of a church, viewed on the side in which is the great door.

Portail is also used for the great door, or gate itself of a palace, castle, &c.

PORTAL, a term used for a little square corner of a room, cut off from the rest of the room by the wainscot; frequent in the ancient buildings, but now disused.

The word seems a diminutive of the French *porte*, door, gate, it being through this that they entered into the room.

PORTAL is sometimes also used for a little gate, *portella*; where there are two gates of a different size. See **GATE**.

PORTAL is sometimes also used for a kind of arch of joiner's work before a door.

PORTAL di St. Luis, in *Geography*, a town of Brasil, in the government of Goyas, on the river Tocantin. S. lat. $13^{\circ} 30'$.

PORTALEGRE, a town of Portugal, in Alentejo, the see of a bishop; containing, besides the cathedral, four parish churches, five convents, an hospital, and about 5600 inhabitants; fortified with walls and towers; 84 miles E. of Lisbon. N. lat. $39^{\circ} 8'$. W. long. $7^{\circ} 11'$.

PORTALOON. See **PUTELAM**.

PORTAMENTS, in *Italian Music*, signifies the conduct of the voice, which is said to be good, when it is neither nasal nor guttural.

PORTARLINGTON, in *Geography*, a post-town of the Queen and King's county, Ireland, being partly in each, but chiefly in the Queen's county. It is situated on the river Barrow, by which it is divided. It is a large town, and an agreeable residence, from the number of genteel families which live there. It was formerly a settlement of French Protestant refugees, the descendants of many of whom are still living there, and is remarkable for a great number of schools for children of both sexes, which are principally employed in the preparative education of very young children. At the union it was chosen as one of the boroughs to be represented, and accordingly sends one member. It is 37 miles W.S.W. from Dublin.

PORTARUM VENA, in *Anatomy*, a large vein, produced by the union of the veins of the stomach, intestines,

spleen, and pancreas, and ramified in the liver. See **LIVER**.

PORTASCAWET, or *Port Skezewet*, in *Geography*, a small sea-port of England, in the county of Monmouth, on a small river, which runs into the Severn; anciently, before the building of Chepstow, the only port in the country; 4 miles S.W. of Chepstow.

PORTATE, in *Heraldry*. A *cross portate* is a cross which does not stand upright, as crosses generally do, but lies athwart the escutcheon, in bend, as if it were carried on a man's shoulder. See **CROSS**.

Colombiere tells us, it is by some called *porté*, that is, *carried*, because, when our Saviour went to suffer death, he was obliged to carry his cross, which is always thus represented sloping, and inclined after this manner.

PORTCHESTER, or **PORTCHESTER-STREET**, in *Geography*, a parish and village in the hundred of Portfdown, in the vicinity of Portsmouth, and county of Southampton, England, is a place noted for its ancient castle, and military barracks. The former appears to be partly of Roman construction, with additions and alterations by the Saxons, Normans, and English. It is seated on a neck of land, in the middle of Portsmouth harbour, or bay, and consists of a series of walls and towers, which occupy an area of about five acres of land. The walls are nearly twelve feet thick, and eighteen feet in height, and have in many places a passage round them covered with a parapet: it has eighteen towers of various shapes and magnitudes, including those of the keep, and is defended on the north, west, and south sides by a ditch varying in breadth, and fifteen feet in depth: on the east are two ditches which extend to the water, and have probably been filled by the influx of the tide. The entrance on the west side is thirty feet deep and fourteen wide, under a square tower: on the inside, over the gate, are two projecting figures, somewhat resembling Egyptian sphynxes. In the east wall, nearly opposite this gate, is another of like dimensions: there are likewise two sally-ports.

The keep, observes Grose, encompasses a parallelogram of sixty-five feet by one hundred and fifteen. It has four towers, three of them standing on the outside wall: one of these, which is much larger than the rest, forms the N.W. angle of the square; the fourth tower stands at the S.E. corner of this building. Here are many rooms, several very large, and some arched with stone: among them is one which appears to have been a chapel; the entrance is through a gate on the south side, only eight feet wide. Several of these towers, as well as parts of the walls, are now in ruins.

The round towers are placed at the north-east, south-east, and south-west angles; the north-west angle is now taken up by the great square tower of the keep: some of these towers are twenty and others nineteen feet in diameter; and in general they project about eighteen feet and a half from the wall. In some of them are still visible regular rows of Roman brick, dividing the rows of stone-work; and particularly in one on the south side, in which are three rows very distinct: in the wall itself on this side they may also be traced, and indeed in many other parts. The extent of the outward walls, exclusive of the projecting parts of the round corner towers, is about 620 feet on the north and south sides; and 610 on the east and west sides. In the keep, which forms the north-west angle of the castle, traces of the architecture of the Saxon and Norman periods, and even of later ages, to the time of queen Elizabeth, are plainly to be seen. The great tower is lofty, and contains two vaults or dungeons at bottom, with the remains of three double apartments above them, in so many several stories:

its walls are nearly eight feet thick; and its external dimensions on the north and south fifty-seven feet; and on the east and west fifty-eight feet.

The most curious part of the inner or *Norman* court, as it may be called, is its fortified entrance, which opens from the outer area on the east, where is a large Norman tower, which is now much dilapidated, built on the Roman work; and formerly secured by a portcullis, and double-folding doors strongly barricadoed. The west, or opposite entrance, is also by a strong Norman tower, about 35 feet wide and 30 deep, having a passage through the centre about eight feet in width; this also is in ruins.

The *Sacellum of the Prætorium* of the Romans is supposed by Mr. King to have been on the spot now occupied as the site of the parish church, which is an edifice of great antiquity, dedicated to St. Mary, standing within the outer court. Though part of it has been rebuilt and other parts repaired at various periods, it still displays many specimens of Saxon architecture, particularly in the west front. Its original form was that of a cross, with a low tower rising from the intersection; but the south transept has been taken down. All the doors and windows of the ancient part have semi-circular arches; and those of the west end are decorated with double zig-zag ornaments. Here it was that Henry I. founded the priory of Black canons, afterwards removed to Southwick. Within the church is a monument to the memory of sir Thomas Cornwallis, knt. groom porter to queen Elizabeth and James I., who died in November 1618. Here is a curious and ancient font. Parts of the castle were recently fitted up for, and occupied by, prisoners of war; but it is hoped that it may never again be required for that purpose.

It has been asserted by some writers, that the Roman general Vespasian landed here on his first arrival in Britain; but this has been contradicted by others on better testimony. That it must have been in his possession is, however, extremely probable, as the conquest of the Isle of Wight could hardly have been otherwise effected. That several of the Saxon invaders landed here is more certain, and particularly Porta, with his sons Bieda and Megla, by whose aid Cerdic was enabled to establish the kingdom of the West Saxons. At what period it was deserted of inhabitants is unknown; though presumed to be on the rise of Portsmouth, after the sea had in some degree retired from the upper parts of the harbour. This place is generally admitted to have been the *Portus-Magnus* of the Romans, and the *Caer-peris* of the Britons. For a more ample account of the castle and village, the reader is referred to King's *Munimenta Antiqua*, vol. ii., and to the *Beauties of England and Wales*, vol. vi., by J. Britton and E. W. Brayley.

PORT-CRAION, a pencil-case, an instrument serving to enclose a pencil, and occasionally also used as a handle for holding it.

It is usually four or five inches long, and contrived so that the pencil may be slid up and down it by means of a spring and button. Its outside is filed into eight sides or faces, on which are drawn the sector lines: its inside is round; sometimes it is made round or cylindrical, both withoutside and within, and has its length divided into inches and parts of inches.

PORTCULLICE, called also *berse* and *sarrasin*, in *Fortification*, an assemblage of several great pieces of wood laid or joined across one another, like a harrow, and each pointed at the bottom with iron.

These formerly used to be hung over the gateways of fortified places, to be ready to let down in case of a surprise,

when the enemy should come so quick, as not to allow time to shut the gates.

But now-a-days, the orgues are more generally used, as being found to answer the purpose better.

PORT-DIEU, among the French, is a parish-priest, whose business is to carry the viaticum, or sacrament, to sick people.

PORTE, PETER DE LA, in *Biography*, was first train-bearer to queen Anne of Austria, and afterwards maitre d'hotel, and first valet-de-chambre to Lewis XIV. He was the sole confidant of the queen, who entrusted to him her secret correspondence with the kings of Spain and England, then enemies to France. He was thrown into prison by cardinal Richelieu, who not only caused him to be treated with great rigour, but even threatened him with death, in order to compel him to betray the queen's secrets. He remained firm, and was liberated, but exiled. La Porte was a man of considerable worth, and of elevated sentiments, and executed his office about the young king with a true regard to his master's advantage. Having noticed his fondness of personating a valet, he one day seated himself in the armed chair, with his hat upon his head. On the king's complaining to his mother of La Porte's want of respect, he replied, in his presence, "Since the king has chosen to assume my part, is it not reasonable that I should take his? and, in truth, I am no loser by the exchange." Lewis was desirous of continuing the custom of being read to sleep by the Fairy Tales; but La Porte substituted Mezerai's History of France: when cardinal Mazarin, who would gladly have protracted the period of the king's ignorance, complained that the *domestic* wished to make himself *governor*. He died at Paris in 1680, at the age of 77. His "Memoirs" were published at Geneva in 1756, which contain much curious matter, that bears the stamp of truth and integrity.

PORTE'E, Fr. the five parallel lines on and between which all music is now written. Till the middle of the last century, lutes, guitars, and some other instruments, had peculiar tablatures; but these are no longer in use at present, nor have any new schemes of notation been favourably received in any part of Europe. See STAFF.

PORTEGLO, in the *Glass Trade*, the instrument with which the founder, or conciator, scums the glass while melting.

PORTELA, in *Geography*, a town of Portugal, in Alentejo; 10 miles N.N.W. of Mourao.

PORTELA *das Cabras*, a town of Portugal, in the province of Entre Duero e Minho; 7 miles N.W. of Braga.

PORTELET, a small island near the N. coast of the island of Jersey.

PORTELLA, a town of Naples, in Lavora; 6 miles W. of Fundi.

PORTENDICK, or *Port Addi*, a town of Africa, in the country of Zanhaga, inhabited by Moors, whose chief trade is fishing, and gathering of gum in the neighbouring woods: it is situated on a bay, on the west of the Atlantic. N. lat. 18° 6'.

PORTENDICK, *Little*, a sea-port of Africa; 25 miles S. of Portendick.

PORTER, a lake of Nova Scotia, lying a little E. of Halifax, and emptying its waters into the ocean, about 15 miles E. of that place; 15 miles long, and 1½ mile broad.

PORTER, in the *Manege*, signifies to direct or push on a horse at pleasure; whether forwards, or upon turns, &c.

PORTER, a malt liquor, which is a favourite beverage of the inhabitants of London, and other large towns. The dis-

PORTER.

tinguishing characters of this liquor are its deep brown colour, and an agreeable flavour, which it is difficult to describe, our language having so few words expressive of different tastes. The origin of the name is thus related by the ingenious editor of the *Picture of London*. "Before the year 1730, the malt liquors in general use in London were ale, beer, and two-penny, and it was customary for the drinkers of malt liquor to call for a pint, or tankard, of half and half, *i. e.* a half of ale and half of beer, a half of ale and half of two-penny, or half of beer and half of two-penny. In course of time it also became the practice to call for a pint or tankard of *three-threads*, meaning a third of ale, beer, and two-penny; and thus the publican had the trouble to go to three casks, and turn three cocks, for a pint of liquor. To avoid this inconvenience and waste, a brewer of the name of Harwood conceived the idea of making a liquor, which should partake of the same united flavours of ale, beer, and two-penny; he did so, and succeeded, calling it *entire*, or entire butt, meaning that it was drawn entirely from one cask, or butt; and as it was a very hearty and nourishing liquor, it was very suitable for porters and other working people; hence it obtained the name of porter." The house of Harwood is still a respectable brewery; but an immense trade has, since the period above-mentioned, arisen, and is divided among several brewers.

At first, the only essential difference in the methods of brewing porter and other kinds of beer, was, that it was brewed from brown malt, and this gave to it both the colour and flavour required. Of late years it has been brewed from mixtures of pale and brown malt, and the colour of the present liquor is much less than was formerly esteemed requisite: but finding that pale malt yields a much greater portion of saccharine matter than brown, the greatest number of the London brewers have given up the brown malt altogether, using pale and amber malt, which is intermediate between the two. From these they procure a liquor of proper strength, and they give it both colour and flavour, by the addition of colouring matter made from burnt sugar, or by burning the sugar of concentrated wort. All the London porter is professed to be entire butt, as indeed it was at first; but the system is now altered, and it is very generally compounded of two kinds, or rather the same liquor in two different stages, the due admixture of which is palatable, though neither is good alone. One is mild, and the other stale porter; the former is that which has a slightly bitter flavour, from having been lately brewed; the latter has been kept longer. This mixture the publican adapts to the palates of his several customers, and effects the mixture very readily, by means of a machine containing small pumps worked by handles. In these are four pumps, but only three spouts, because two of the pumps throw out at the same spout: one of these two pumps draws the mild, and the other the stale porter, from the casks down in the cellar, and the publican, by dexterously changing his hold to the handle of the next pump, works either pump, and draws both kinds of beer at the same spout. An indifferent observer supposes, that since it all comes from one spout, it is entire butt beer, as the publican professes over his door, and which vulgar prejudice has decided to be the only good porter, though the difference is not easily distinguished.

By referring to the article BREWING, our readers will obtain correct ideas of the general principles of the art, and under the present we propose to detail the process of brewing porter; and also to describe the utensils and machines used by the London brewers, who, in consequence of the very large scale on which they conduct their processes, have been

induced to study, with the most minute attention, every thing which can tend to improve their beer, or economize the materials; as also to diminish the labour of removing such large quantities of liquor from one part of the works to another: in this their grand agent is the steam-engine, which gives motion to several very capital machines.

There are in London twelve houses, which are considered as the principal porter-breweries, and from the returns of the excise, we find that the quantities of beer they brewed in the course of two years, *viz.* from July 1810 to July 1812, was as follows.

	Barrels in 1810 and 11.	Barrels in 1811 and 12.
Barclay and Perkins, Borough	264,405	270,259
Meux, Reid, and Co., Liquor-pond- street	220,094	188,078
Truman, Hanbury, and Co., Brick- lane	142,179	150,164
Whitbread and Co., Chiswell-street	122,316	122,446
Calvert and Co., Thames-street	105,887	108,212
H. Meux and Co., Marlborough- street	103,152	102,403
Combe and Co.	81,761	100,824
Brown, Parry, and Co., Golden-lane	72,367	—
Goodwynne and Co., Wapping	85,181	81,022
Elliott and Co., Pimlico	58,042	58,385
Cocks and Campbell	—	51,474
Taylor	46,222	51,220
Clowes, Maddox, and Newbury, Tooley-street	36,872	34,010

Of these works, the first that had a steam-engine, and the most complete in its arrangement of the utensils, is Mr. Whitbread's in Chiswell-street. This gentleman having permitted our draughtsman to take drawings from the most interesting parts of his extensive works, we shall proceed to explain them, with the assistance of *Plate Porter Brewery. Figs. 1. and 2.* of this plate are elevations of the whole brewery, being intended to shew the connection of all the parts at one view; but we must premise, that these elevations are in a great degree imaginary, and are not to be considered as taken upon any particular planes, because the different erections would then fall one behind the other, so as to hide them from the view; they are therefore represented in such situations as would be most convenient for explanation; but the relative levels, as also the dimensions of the individual vessels, are correct. A A, (*fig. 1.*) is the building containing the steam-engine, which is of twenty horses power, and gives motion to all the machines by a wheel on the axis of the fly-wheel, turning another upon the horizontal shaft, and this leads to the mill, where it turns the great horse-wheel B B. This wheel drives several other wheels, to convey the power in different directions. It was the original first mover of the mill; and when, (by the invention of Mr. Watt,) the steam-engine was rendered applicable to turn machinery, the horse-wheel was very judiciously retained, as by this means, if the engine should break, or be disabled, during the process of a day's brewing, the work can be continued by putting the horses to the wheel. This is a great advantage, because the delay of a few hours in pumping up the beer, in more than one of the stages, would certainly produce a premature fermentation, and spoil the whole quantity. The water for the brewery is raised from a deep well by a pump placed in it, and this is worked by cranks and rods, *b*, from the beam of the engine. The well is situated out in the yard, and the cranks are placed in an arched passage, which leads from the engine-house to the well. The

pump, by means of a pipe *d*, forces the water up to an immense reservoir, called the *liquor back*, placed at a sufficient elevation to supply the whole brewery. In *fig. 1.* this reservoir is represented as placed over the steam-engine, which indeed is its usual position in the large London breweries, but in Mr. Whitbread's it is erected over some buildings which could not be shewn in our plate: from this the reservoir pipes are laid, to convey the water to any part of the works where it may be required. The principal of these are to the coppers B, of which there are three, placed close together, but only one can be seen. C is the chimney for it, and the same roof, D, covers them all. The water, being heated in the coppers, is conducted by a pipe, *e*, to the mash tuns E: one of these is placed immediately before each of the coppers, though only one is to be seen in the view. During the process of mashing, the malt is kept constantly stirred by machines in each tun, which receive their motion from the steam-engine by the shaft *f*: this passes over the centre of all three, and by means of bevelled wheels, gives motion to a vertical axis in the centre of each tun, which are the principal axes of the machines. The malt, previous to mashing, is ground, or crushed, to render the husks pervious to the water. In most breweries it is ground between mill-stones, such as are used for grinding corn, but in these works it is broken between iron rollers, *g, g*, similar to those used for flattening iron: they are 18 inches in diameter, and two feet six inches in length, and are situated at such a distance asunder, that only a piece of thick brown paper can be passed between them; they are turned by wheels from the long horizontal shaft *a*, and immediately above them is a third roller, which has a number of deep flutes, or cavities, cut in it, from one end to the other, and these, as it revolves, become filled with malt from the hopper above, and then deliver it to the two rollers, which, being in motion, take it between them, and crush all the grains flat. By this, which is called a feeding roller, the supply to the rollers is kept constant and regular, without which they would be in great danger of clogging up, or setting fast. The malt, when it has passed through the rollers, is completely broken, even its most minute grains, but very little of it is cut into flour; for the husks of the malt, though cracked so as to admit the water readily to the contents, still prevent the flour being separated. This is a great advantage over the method of grinding, because that produces a great quantity of flour, which is the richest part of the malt, but when it is ground fine, and separated from the grain, it does not yield so much extract in the mash tun, as when it is preserved in the grain, and the husk sufficiently broken. This is because the flour, when immersed in the water, and wetted, forms a sort of paste, which at first absorbs a considerable portion of water, but will not afterwards quit it, so that very little extract is obtained from that portion of the malt which is separated from the grain, in the state of flour. The store of malt, before it is ground, is kept in the malt lofts over the mill, as represented. When it is brought in waggons to the yard, close by the mill, the sacks are drawn up by the tackle at F into the loft, and here the sacks are shot down, through holes in the floor, into the great store malt lofts, and from these, as it is wanted, is drawn out, through shuttles, into the hoppers of the rollers *g, g*. The store lofts extend much farther than we have been able to represent them in *fig. 1.* but may easily be imagined, as they are only a repetition of eight or ten of those shewn in the figure, the same loft extending over the whole, and the same sack tackle drawing up the sacks from the carts in the yard; though this, of course, is not situated at the end of the mill over the pumps, but at the side, where it could not have been seen. The malt, after passing through the rollers *g, g*, descends into

a chest, whence it is conveyed to the malt bins over the mash tuns E, by the motion of an inclined screw *b*: this is a wooden trunk or trough, in which the screw is fitted to revolve, and thus gradually pushes or raises the malt which is contained in the trough, from the lower end of it to the upper, which, being within the malt binn, and at the farther end of it, the screw completely fills, by distributing the ground malt at all parts of its length. The screw itself is formed of thin iron plates, bent into a screw, and fastened, by nails, to a central wooden axis, which revolves by the mill. When the malt is wanted for mashing, it is let down from the binn into the mash tuns, through sluices, or shuttles, in the bottom of it, and curtains are hung up all round from the binn to the edge of the tun, to prevent loss from the dust or flour of the malt flying in the air. After the process of mashing has continued a sufficient time, the extract or wort is drawn off from the mash tuns into other tuns, G, beneath, which are called the under-backs; here it remains only till the coppers are ready to receive it; and it is thrown up by the pump, H, into the copper-back I. This is a shallow cistern placed above the coppers, and from it the wort can be admitted into any of the coppers, or into their pans: these are vessels which are placed over the coppers, and their contents receive heat from the steam raised by the boiling of the copper itself.

To understand this see *fig. 3.* which is a section taken through the centre of the copper. A A is the fire-grate, B B C the copper itself, containing 350 barrels; its top is a dome, and has a cylinder, G, rising up from it: F F is the pan, erected upon the top of the copper, and enclosing the dome C, within. The pan contains 250 barrels of liquor, which is heated by the steam rising into the cylinder G, and thence descending by pipes *d, d*, down into the liquor, and bubbling up through it. The heat communicated through the dome also assists in heating the contents of the pan. There are two valves in the head G, which are kept shut by steelyards and weights; but these being opened, the steam of the copper is allowed to escape through a copper pipe or chimney, K, (*fig. 1.*) into the open air. E (*fig. 3.*) is an iron door, to allow entrance, into the copper, and also to put in the hops; it is situated on the top of a cylinder rising from the dome, and is fitted so closely by grinding, that it is steam-tight when shut, and forced down upon its seat by a screw. Two flues proceed from the fire-grate at the farther end, and conduct the flame and heated air round in opposite directions, as shewn at D D, to the chimney, which is placed over the fire doors, and thus the heat is applied to the sides, as well as to the bottom of the coppers: this, as the figure shews, is made concave beneath, to allow a greater action to the fire. The chimney is open at the bottom, and, therefore, the draught it occasions through the flues is only by the lateral action of the current of air, occasioned by the column of rarefied air in the chimney; but this draught can be cut off, when it is required to damp the fire, by shutting up two iron doors at the ends of the flues, and then no air can pass through the fire. In some breweries, doors are provided to shut up the bottom of the chimnies, and thus increase the draught, by compelling all the air which enters the chimney to pass through the fire-grate, and thence by the flues into the chimney; this causes the copper to boil much quicker, but the violent heat soon destroys the copper at the bottom, by burning or melting it. When the hops are boiled in the copper, they are kept in constant motion, to prevent their lying upon the bottom and burning to it. This is done by a machine called the *rowser*, contained within the copper; it consists of a vertical spindle, *e*, in the centre of the copper, which at its lower extremity has a cross arm, *g*, curved, to correspond with the bottom, and

from this a number of loops of heavy chain are suspended, to drag round upon the copper when the spindle is turned, and by this means the hops are raked over and continually disturbed. The spindle passes through a stuffing-box in the centre of the top, G, of the copper, and is turned round by a wheel *f*, engaged with another upon a shaft receiving motion from the engine. The direction of this shaft is shewn dotted in *fig. 1*, at *x*, but is there vastly extended in length, as is also the screw for the malt, because the engine and mill in reality stand in the line of the house containing the coppers and mash tuns, and at the end of them, in which position it would have been hidden by the building. The same shaft, *x*, also gives motion to the hop tackle, for drawing the hops up to the top of the copper, where they are thrown in at the door of it, E, *fig. 3*. The rowser can be drawn up from the bottom of the copper when it requires to be cleaned, for which purpose its spindle is suspended by a sort of tackle, that will quickly raise it up six or seven feet. The copper is provided with a float, to shew the height of the liquor within it: this consists of a strong wire, passing down through a tight stuffing-box in the top of the copper, and suspending a stone at the lower end of it: from the upper end of the wire a line is conducted over pulleys, which has a ruler or rod divided into feet and inches suspended from it, with a weight greater than the weight of stone when it is suspended in the liquor, but less than the weight of the stone when it is drawn up out of the liquor. In this situation the stone will always be at the surface of the water, in the same manner as if it floated, and will shew the height of the liquor in the copper. There are several pipes and cocks belonging to the copper, which are as follows: a pipe leading from the liquor back to introduce water into it; this has a cock formed of two passages, one admitting it to flow into the pan, and the other conveying it by a short pipe into the copper itself, and the handle being turned in one direction or the other, shews which way it will run, or turned in another direction it stops up the pipe; there is also a hole in the bottom of the copper back, through which the contents run down into the pan, but can be closed by a plug, and near it is a pipe leading down through the pan into the copper; this is closed by a valve, which can be opened by a lever and screw, when it is required to convey the wort from the copper-back into the copper itself; there is also a valve, which communicates at once from the pan down into the copper. From the bottom of the copper is a large cock with a pipe *e*, which runs horizontally over all the three mash tuns, and at every one a branch descends beneath the bottom of the tun, and turns up, with two or three smaller branches, leading into different parts of the bottom, by which means the hot liquor is admitted from the copper into the tun; it enters in different places at the same time, a precaution which is very necessary to distribute it equally through the whole of the malt in a tun, which like this is twenty feet in diameter; but to do this more effectually, the tun has a false bottom perforated with small holes; upon this the malt lies, and the water, being introduced beneath it, flows upwards through the holes in all parts at once.

The mashing machine, (see an elevation of it in *figs. 4* and *5*.) is composed of several endless chains, R, extended over two wheels in the manner of chain pumps, and the links of the chains have rakes, *d*, fixed upon them, and as the wheels revolve, ascend and descend through the whole depth of malt contained in the tun, and thus effectually stir up the whole to incorporate it with the water. That this action may be performed in all the parts of the tun, the frame containing the wheels and chains is adapted to have a progressive motion round in the tun, by turning round upon the vertical axis, D, in the centre. This axis has a bevelled wheel, E, upon it,

which turns another upon the end of a horizontal shaft F, carrying the wheels, *e*, for the chains R, and extending from the centre of the tun to its circumference, that end being supported in a frame S, which rests with wheels upon the rim or edge, T, of the tun: the interior end is sustained by a frame S, (*fig. 5*.) fitted upon the vertical axis, D. Near the bottom of the tun another horizontal shaft, V, parallel to the former, is placed, and has upon it the lower wheels, *e*, for the endless chains of rakes. The pivots of this shaft are supported in the same frame S, as the upper: this being, as before mentioned, fitted upon the central axis, D, at one end, and the other end resting with wheels upon the edge, T, of the tun, it may be made to traverse round the tun. This is done by having a ring of cogs fixed upon the edge of the tun at T; and an endless screw, which is supported on the frame S, engages the teeth. By means of bevelled wheels, *l*, this screw is turned slowly round from the upper axis, F, of the chain wheels; and it can, by means of a small handle, be disengaged from the motion, or it can at pleasure be engaged with either of two different pairs of the bevelled wheels, one giving it a slow motion and the other a much quicker; the first being used to traverse the machine round the tun till the malt is completely wetted, and then the quicker motion is used to mash the malt up thoroughly. This machine is the invention of Mr. Cooper, who had a patent for it, and has made great numbers. Several other ingenious machines have been invented, but are not yet in general use; one by Mr. Sylvester, another a patent by Mr. W. Jones; (see Repertory of Arts, first series, vol. ix.); a very simple one by Mr. Goodwynne, which he employs in his own brewery; a fifth kind of machine is described in our article BREWING. Mr. Jonathan Dickson has a patent for a method of making mash tuns in cast iron, by which the very heavy expences of constantly repairing, and often renewing, wooden vessels is reduced to a trifle. Messrs. Barclay and Perkins have one of these in use at their brewery. The mash tuns at Mr. Whitbread's brewery are lined with thin sheet copper, applied in the same manner as the sheathing of a ship, to prevent leakage, and keep the vessel sweet and clean. The mash tuns are supported upon a framing of timber, as shewn in *fig. 1*, which leave room within them for the under-back G. The malt-binns are supported over them by an assemblage of pillars between each of the tuns; and to give greater strength to the horizontal beams 1, which are beneath the binns, other horizontal beams, 2, are placed at a considerable height above them, and the two pairs being connected by framing and oblique braces, they form a truss frame similar to a roof, which will bear the weight of the binn, when full, without sinking. The pipe 3, which draws off the wort from the under-back, is conducted to the three-barrelled pump at H, which is worked by the mill: this elevates it to a trough, which extends over the whole length of the copper-back I, and by means of a plug in the bottom the wort can be let down into it.

When the wort has been boiled in the copper with the hops, both together are run off, at *k*, into the jack-back M: this is in reality a large strainer, to separate and retain the hops. It is a very large back, provided with a false bottom, composed of cast-iron plates pierced with small holes. Through these the liquor drains, when the pipe, *l*, from the bottom of the back is opened, and the hops are left upon the false bottom: the pipe, *l*, is conducted to the pump at H, and this raises the wort up to the same trough, over the copper-backs I; but instead of being run into these it is conveyed forwards, by a succession of troughs, and distributed into the different coolers N, N. These are large backs, and very shallow, several being placed in succession over each other, and the windows of the building are made very open,

to admit a current of cold air, to carry the heat off from the beer. In these it remains a sufficient time, till it is cooled to the temperature desired, and then it is drawn off from the coolers into the fermenting house. This is a very large building, placed adjacent to the engine-house. A section of it is given in *fig. 2*: here *p* is the copper pipe, proceeding from the coolers (having numerous branches to all of them), to the gyle-tuns, or squares P, which are large open vats, of sufficient capacity to contain the beer of a whole brewing; here yeast is put to it, and the fermentation commences, and having continued a sufficient time, the beer is distributed into the small tuns, Q, called rounds, where the fermentation is concluded, and the yeast, as fast as it is produced, flows over by a spout into the troughs *m*, which are placed between every two rows: this cleanses the beer, by the separation of the yeast from it; and as by the division into small quantities, (for the rounds only contain nine barrels each,) the temperature is lowered, and as the disposition to fermentation gradually subsides, the beer becomes fit for storing in the vaults or under-ground cisterns T, that it may be kept, till by age it becomes fine and fit for the table. The squares P, (for there are two, one behind the other,) are 22 feet by 24, and 9 feet deep, so that their content is nearly 800 barrels each. The pipe *p*, from the coolers N, (*fig. 1.*) has a branch proceeding to each square, and a double-passaged cock, 4, which will admit it into either, according as the handle is turned to one or the other. The pipe itself proceeds in an inclined direction to the bottom of the square, as shewn by the dotted lines, and thus introduces the beer in the centre, by which means, if there is any variation of temperature in the contents of the square, and that which has recently entered, it will sooner be brought to an equality.

Mr. Richardson, who conducts the brewing at Mr. Whitbread's works, has made an arrangement which deserves particular notice, and is worthy of imitation by other brewers. The pipe, *p*, is made of thin copper, and is enclosed within another pipe, the space between them being supplied with a stream of cold water. To effect this, the main ascending pipe, from the well to the liquor cistern, is not in reality carried up direct, as shewn by *d*, in *fig. 1*, but is placed in the angle of the fermenting house at *dd*, *fig. 2*. A branch, 5, proceeds along the wall thereof, then makes a turn, and joins the external pipe *p*: from the other end of this a branch is conducted to return the water to the main ascending pipe *d*, and in this there is a cock between the two branches, and another upon the branch: now the latter being shut, and the former open, the water ascends at once up the pipe from the well to the reservoir; but when the beer is to be drawn off from the coolers into the squares, the cock in the main pipe, *d*, is shut, and the other opened, by which means all the cold water which the pump throws up from the well is forced through the space surrounding the pipe *p*, in which the beer flows, and thus cools it very effectually. To determine the temperature, the bulb of a thermometer is placed in the centre of the pipe, and its tube comes up through it at 6; then a man is stationed to watch this, and when he observes it sink to the degree at which it is determined that the beer shall be left to ferment, he opens the cock and permits the beer to flow into the square; but still continues to observe the thermometer, and if it sinks lower he opens the cock wider, to admit the beer to flow quicker through the pipe *p*, that it may not be so much cooled by the flow of the cold water; or, if this is not sufficient, he regulates the quantity of cold water, by means of the cocks in the main pipe and the branch: on the other hand, if the thermometer indicates that the beer is not sufficiently cooled,

the cock is closed a little; this retards the passage through the pipe, and lowers the temperature, by subjecting it for a longer time to the action of the cold water. By this simple contrivance, the brewer is at a certainty that his liquor has been put to ferment in the square or gyle-tun P, at the exact heat which he intended, a circumstance which was before very uncertain; because, being drawn from so many different coolers, some would of course be less cooled than others, from their different situations, and it could only be guessed what temperature all these different degrees of heat would make when mixed together in the square, and the larger the scale of operation, the more uncertainty; because such large bodies of liquor take a considerable time to flow, and by passing such great lengths of pipes generally lose some heat; but it cannot be guessed how much. In Mr. Richardson's method, this is accurately determined, and capable of regulation. A long thermometer is fixed in the sides of the squares, to shew the temperature of their contents, and this is found to increase during the fermentation; no yeast is removed from the beer in this stage, indeed scarcely any is formed, for though a very large white head collects upon the surface, it is only light bubbles which instantly fall by the least agitation. The fermentation in the squares is generally concluded in thirty hours, and then the beer is removed to the rounds for cleansing from the yeast. It is first run off by a pipe 7, from the squares, into the filling up vessels R, R, which are in reality placed in the space between the two squares; but could not be so represented. When these are full, the pipe is shut, and another cock, 8, opened, which permits the beer to flow through pipes 9, conducted beneath all the rounds Q, Q; and from these, cross branches are conducted between every two rows, and by short pipes introduce the beer into the casks: thus they are all filled at once, and then the cock, 8, is shut. The casks are 240 in number, being arranged in sixteen of the rows which are seen in our figure, though only eight are drawn there; and each row contains fifteen of these casks. The troughs, *m*, between each pair of rows extend the whole length to receive the yeast produced from them, which in this stage of the fermentation is caused to flow off as fast as it is produced; and by this means it is that the fermentation is allayed, because the yeast which constantly keeps it going on, is not suffered to rest upon the surface of the beer. To render this effective, the rounds have close heads, and rather inclined to one side, where is a spout to conduct the yeast into the trough, therefore this spout is at the highest part; and there is no considerable surface exposed, upon which a head of yeast can float, to keep up the fermentation. But as the rounds gradually diminish in content, they are filled up by fresh beer from the filling-up tuns R, which were previously filled, as a reserve for that purpose. A pipe from the bottom of these enters into a small cistern S, where its orifice is closed by a valve. This is opened by a wire, which is connected with a lever, and a float, which floats upon the surface of the liquor in the cistern; and this is, by means of the communicating pipes 9, kept at the same level with the surface of the beer in all the rounds; there being a free communication amongst them all. Now when, by the wasting of the yeast, the beer in the rounds sinks, the float in the cistern sinks, and opening the valve, admits a sufficiency of beer from the filling-up vessels to restore the level, and then the valve closes again. To prevent the beer in the filling-up vessels having an exposed surface, and to carry off the yeast from them as fast as it is produced, a moveable or floating head, 10, is adapted to the tun. This is a slightly concave pan, or dish, of plate iron, which has a pipe fixed perpendicularly down from the centre

centre of it, and passing through the bottom of the vessel, in a stuffing-box. This dish floats upon the surface of the beer in the filling-up vessel, and as it is not quite so large as the inside of the tun, the yeast runs over in this space, and, falling down the pan to the central pipe, runs through it into troughs placed beneath, which convey it, in common with the produce of all the other casks, to a tank, or receptacle, sunk in the ground. From this tank the yeast is raised by a pump into casks, in which it is sent away, for the use of bakers, distillers, and others who employ it. Whilst remaining in the tank, a considerable portion of beer, which the yeast carries over with it, drains away; and this is drawn off by a pump, which drawing from a lower level than the yeast-pump, raises the beer into a different cistern; and here it remains 48 hours, to ferment and cleanse itself. It is then pumped up into shallow settling backs, V, V, V: in the highest of these it remains some time to settle, and deposit any yeast it may contain, and is then drawn off into a second, and then to the third, by which it becomes clear, and is good strong liquor, though unpalatable; but being introduced into the square, at the same time with a succeeding brewing, it adds to its quantity, without injury of the quality. By this means, no waste takes place in any department of the work.

When the beer has been sufficiently fermented, and the flow of yeast ceases, by which the brewers say it has sufficiently purged itself, it is drawn off from the rounds, Q, to be stored. That is done either in large tuns W, or otherwise in the cisterns, or underground vaults T: the former is the general system of the London brewers; but the latter, which is only practised at Mr. Whitbread's, is undoubtedly the best method, because of the equality of temperature they preserve both in summer and winter; and their durability, compared with the wooden vats, is no small recommendation. Many breweries have wooden store vats of immense capacity, being as much as 40 feet in diameter, and 20 feet deep. They are placed upon timbers, and supported by pillars, that small casks may be kept beneath them; and the beer can be drawn off into these, when it is to be sent away from the works. The vaults, T, T, are arched, and lined with stone, well bedded in cement, or pozzolana, and the joints very carefully made. They were built under the directions of the late Mr. Smeaton; but the Roman cement, which has been discovered since his time, would be the best material for jointing and lining them. A very superior cement of this kind, which is now manufactured in the north of Yorkshire, may be procured at Mr. Atkinson's wharf, Narrow-wall, Lambeth, and would enable brewers, who choose to adopt the cisterns, to have them made perfectly tight; whereas in these works they had at first much difficulty, from the defective nature of the cement; though they have remedied this, by employing resinous substances in the joints. Each cistern contains 4000 barrels, and the store is thus kept without the loss of any room in the building; a great consideration in London, where the rent of premises is so high, not to mention the saving in the repairs, and renewal of the wooden vats.

Mr. Richardson has applied an useful contrivance in this brewery, for cooling the beer previous to storing it in summer time: it is done by collecting the beer from the rounds, Q, into a cistern thirty feet square, sunk in the ground, and having a copper pipe conducted round its sides, making three turns in it: through this pipe a constant stream of cold water is conducted, in the same manner as before described, and this cools the beer to as low a temperature in summer as it will naturally have in winter, and then it is not liable to any fermentation in the store vats, which probably

takes place in a slight degree in the ordinary process, and is one reason why beer brewed in summer is seldom so fine as if brewed in winter. In this cistern the beer, being kept quiet and cool, deposits some sediment, apparently of farinaceous matter, which, if the slightest fermentation existed, would be held in the beer, and make it turbid; but here it seems to deposit more, and fine itself to a greater extent, in a very short time, than it would for a long period in the store vats; for we should observe, that one principal object of storing the beer is, that it may by age become fine and transparent, which it does by very slowly depositing the excess of vegetable matter, at the bottom of the vat, in the form of slime: but if the slightest fermentation is excited in the vat, it is put into an agitation, which wholly suspends this deposition, as long as it lasts; hence the great advantage which the brewers have found from employing such large vats as are not liable to sudden variations of temperature; and, for the same reason, subterraneous vaults are better than either.

We have now described the whole of the brewery, excepting only the several store-houses for the hops and coals, of which very great stores must be kept, for such extensive works: the latter are kept in the lower parts of the buildings, in the vaults or arches upon which the coppers are erected, and any other convenient part of the ground floor; and, in like manner, the hops are stowed away in large bags, in the lofts over the malt stores, or any other parts. The number of the rounds, Q, in the fermenting house is not correctly represented in the drawing, nor the extent of the store vats W, which last, at Mr. Whitbread's brewery, are situated in a large establishment on the opposite side of Chiswell-street.

The management of the brewing is thus conducted: A sufficiency of pale and brown malt, mixed, is broken between the rollers two or three days before it is wanted; and for this reason, the malt-bins are made large enough to contain 400 quarters of ground malt. Some kinds of malt, which, the brewers say, have too much *fire* in them, are found to improve by keeping some time before they are broken; but a few days keeping after they are broken will produce the same effect. The water is pumped up into the reservoir till it is full, and in this state the work begins, at two or three o'clock, by lighting the copper fires, and the engine fire, filling the coppers with water, and also their pans. The mash-tuns have the required quantity of malt let down from the binn, the curtains before mentioned being hung up to prevent the dust flying. All this is done by a few men, and the liquor (water) in the coppers is heated to the proper degree, which is generally about 150° for the first mash, its quantity being proportioned to the quantity of the malt, nearly in the proportion of two barrels to the quarter. But both these circumstances vary in different breweries, and from various causes, as has been explained under BREWING; though, we should observe, that the remarks there made, refer rather to the process of brewing on a small scale, than in the large way of manufacture; and though the principles are the same, the actual heats in the large way are much lower, because the loss of heat in the process is so much less in the large vessels.

The liquor being heated is *turned on*, that is, introduced into the mash-tun, by opening the cock, *e*, (*fig. 1.*) and admitting it to flow up through the malt, till in ten minutes time it has completely filled it: the mashing machine is now set in motion by the steam-engine, and works round the tun, with the slow motion for twenty minutes; then the quick motion is cast on for four minutes to complete the mashing; and after this it stands still for two hours to make

make the extract, and settle clear. The tap or cock into the under-back is now set running to drain off the wort, and this is left open, until the water for the second mash is sufficiently heated. This is the water which was at first filled into the pan; and immediately the first liquor quitted the copper, the contents of the pan were let down into it; and having acquired some heat while in the pan, is soon sufficiently heated, perhaps to 160° , and at the rate of one barrel to the quarter, being only half the quantity of the first mash, because so much of that is left in the malt. The mashing machine is worked for this as before, but it only stands one hour instead of two, because the malt was completely saturated before: in this period the first mash is pumped up into the copper, and the hops being added to it, the boiling is begun. The under-backs being thus cleared, the second wort is run off into them, and stands to drain from the malt, till the third liquor (water) is ready: this has been heating in one of the other coppers, till it is at 180° , and is then, in its turn, let down into the mash tuns, is mashed, and stands an hour, during which the second wort is pumped up into the copper back of the second copper, ready for boiling, and is admitted into the pan, that it may gradually heat. If a fourth mash is taken, that no waste may be made, it is heated in another copper, and is not brewed that day, but is reserved for the next brewing, and is then used instead of fresh water for the first mash. Some brewers do not practise this method, because there is in warm weather some danger of a premature fermentation, called *foxing*, taking place in the wort which is kept; but in cold weather it may be safely done, and is a saving. We have now to attend to the boiling: this is continued for the first wort one hour; and the second, being in the pan, receives considerable heat by the steam rising from the copper. When sufficiently boiled, the first wort, together with the hops, is run off into the jack-back M, and hence it is pumped up to the coolers N. The first wort is placed in these coolers, which, being least exposed to the air, will cool slowest, because the object is to get all the different worts cooled by the same time, ready for fermentation. The second wort is let down into the copper the instant the first is run off; and the hops which are left in the jack-back are filled into buckets, and drawn up by the hop-tackle, to be returned into the copper, for boiling with the second wort; but as this continues for two hours, the third wort is thrown up, towards the end of the time, to the second copper, and the boiling begun; for the instant the second wort is distributed into the coolers, the hops are put to the third wort, and boiled with them for four hours. This boiling of the worts, coagulates great part of the solid matters which the wort extracted from the malt, and by thus collecting those minute particles which were before diffused so equally throughout the wort, as only to render it cloudy, into distinct fecula, they are disposed to deposit themselves in the coolers, which they do in great quantities; and it is by this process that the beer is first separated from the grossest part of the extract. The cooling is conducted as expeditiously as possible, and when sufficient, as shewn by the thermometer, all the three worts together are, as before explained, drawn off into the square P, which contains 800 barrels, which is the full quantity of a day's brewing; the yeast is here put to it, and the fermentation begins, and it is by this process the porter acquires its spirituous quality, and is rendered clearer, from the great quantity of mucilaginous matter which is thrown off in the yeast. The fermentation first shews itself, by the whole body of the liquor teeming with innumerable small bubbles rising to the surface, each enveloped in a thin film of yeast, which, as the bubbles

burst, collect into a head or froth, and float on the top of the liquor. The temperature of the fluid increases considerably, and the noise of these bubbles, rising through the fluid, causes a continual singing. Part of the bubbles bursts before they arrive at the surface, and the film of yeast which envelopes them, sinks until it is borne up again by the ascending bubbles. These films form at first a white covering to the surface of the beer, which the brewers call the lamb's back, and as the process advances it becomes yellow, having the appearance of rocks; but this yeast is only a thin watery substance, which quickly melts down into a fluid. When the fermentation has advanced so far, that the head of the yeast begins to sink, it shews the process is past its greatest pitch, and the brewer must check it, or it would soon be succeeded by a second stage of fermentation, which produces vinegar. This check is given by the operation of cleansing, in which, as we have before stated, the yeast is carried off as fast as it is produced, and the fermentation gradually subsides.

To review the several processes of the brewery of porter, it should be observed, that it is required, in the mashing, to extract from the malt all the saccharum it contains; but the heat at which this must be done is also favourable for extracting a great proportion of the mucilage and glutinous parts of the malt, which must afterwards, in some degree, be separated from the wort, and the portion which is left will determine the flavour and colour of the beer. If the heat of the mashing liquor is too low, it will extract so much of these matters, that all the subsequent processes can never separate them sufficiently to make the liquor fine; and at the same time it will not extract much saccharum. But by increasing the heat, the mucilage becomes, in a measure, coagulated in the tun, and is not extracted in so great a degree, whilst the saccharum is taken up by the wort in a full proportion. On the other hand, an excessive heat carries this too far, for it makes a complete paste of the malt, by melting the gluten, and the whole resembles a hasty pudding. This disaster, which the brewer calls *setting the goods*, spoils the whole process, as a great proportion of the water becomes combined with the malt, in the state of paste, and will not run off; whilst that proportion which does remain unmixed, and can be drained out, has extracted little or nothing, either of saccharum or gluten, from the malt. This state of things takes place, in a greater or less degree, whenever the extracting heat is taken too high: the other extreme we have spoken of. Between these the brewer endeavours to keep, and by his success in this simple point, the quality and strength of his beer will be influenced most materially. No precise rules can be given for the actual heats, as they depend upon the nature of the malt, the heat used in drying it, (the brown requiring less heat than pale); the quality of the water has also its share, and the quantity of malt mashed at once, (because a great mash-tun loses less of its heat during the mashing than a smaller one); also the temperature of the atmosphere.

Having been thus necessitated to extract more of the solid matters from the malt that he wishes to retain, the brewer, in the succeeding processes, turns his attention to the most effective means of expelling the superabundant mucilage, and without losing the sugar, to leave a fine transparent and palatable liquor.

By the process of boiling, the grossest part of the mucilage extracted by the wort is coagulated, and in a manner precipitated into distinct fecula, leaving the liquor, which was before thick and muddy, comparatively clear between the flakes, which are so large as to be individually visible. The boiling also extracts the bitter of the hops, which is necessary

necessary to make the beer keep, till it becomes fine and fit for the table; it also concentrates the wort, by evaporating a part of the water used in the mashing: on spreading the wort thin in the coolers, the fecula subsides, and is left behind.

The fermentation in the squares, P, does not expel any of the extract matter, but the chief object of it is, to convert the saccharum into alcohol or spirit, and at the same time it disposes the grosser parts to a more favourable state for the separation which takes place in the second fermentation in the rounds, and by the great quantity of yeast which is thrown off, the beer becomes finer, at the same time that the production of spirit continues, and it loses its sweet taste. When this fermentation subsides, the beer is stored, and remains quiet, the longer time the better, to become clear and transparent; but this is, provided the quantity of hops it had is sufficient to prevent its becoming sour, because the extract of the hop is inimical to fermentation, and prevents that process going on in the store vat, which, if it did, would produce vinegar. What is really intended in the store vat is, to deposit those finer particles of superabundant matter which have escaped the other processes, and the beer improves in its strength.

The porter brewed for the supply of London is kept a very short time, and therefore has a small share of hops; and as it would not have time to become fine, it is fined by a process on purpose, which, indeed, is necessary; for if the beer was kept till it became fine, it would, by the shaking of carriage, when sent from the brewery, be rendered cloudy; the beer is therefore sent away in the rough, and requires fining, which is done by the consumer putting into the cask a small quantity of fining, sent by the brewer with the porter. These finings are made of isinglass dissolved in sour beer, made from the wort of the fourth mash, or sour beer obtained from the waste of any of the processes. A small quantity of this fining being put into the cask, precipitates the minute feculæ to the bottom, and soon renders the liquor quite fine.

In Mr. Whitbread's works no *colouring* matter is employed, as he uses a portion of brown malt; but most of the other brewers use pale malt, and colour the beer, by the addition of certain colouring matter, which being obtained from burning the same substance that causes the brown colour of the highly dried malt, produces a similar liquor, at a far less expence of materials, than when brown malt alone is used; because the pale malt yields a much greater proportion of saccharine matter than the brown, in which a share of the saccharum is burnt up in the kiln, only for the purpose of producing a colour and flavour which may so easily be communicated to the beer of pale malt, by a small quantity of burnt sugar. Many brewers, to avoid the censure of the public, who require them to use malt and hops alone, concentrate a quantity of their best first wort, by boiling in an iron pan, and burn this instead of sugar, from which it does not materially differ.

The process, in either case, is to put a quantity of coarse brown sugar, (or the concentrated wort,) into an iron pan, with a small quantity of water, keeping it constantly stirred up; it is then set on fire, and burnt for a few minutes, to give it the colour and flavour which might be obtained from brown malt. The fire is extinguished by putting on a cover. The residuum is now mixed up with water to the consistency of treacle, and makes the colouring, which is put to the beer while working in the square, and gives it very near the same colour and flavour it would have derived from being brewed from brown malt.

Some of our readers may have met with pamphlets pro-

cessing to describe the process of brewing porter, and mentioning a variety of ingredients, such as liquorice, essential bina, treacle, capsicum, ginger, lime, coriander seeds, cocculus indicus, &c. &c., but the writer of this article, having visited nearly all the great porter breweries in London, where he has been shewn into all their store-houses, and examined every process, can safely assure our readers that no articles more than malt and hops, except the colouring and finings, are used in their works, whose beer is reputed to be the best of any, nor has he ever met with any brewer who employs such articles for brewing porter.

PORTER, in the *Circuit of Justices*, is an officer who carries a verge, or white rod, before the justice in cyre; so called à *portando virgam*.

PORTER of the *Door of the Parliament House*, is a necessary officer belonging to that court; who enjoys the privileges accordingly.

PORTER, *Groom*. See *GROOM Porter*.

PORTERS, *Tackle-house*, who have ticket porters under them, are regulated by the city of London. They have the privilege of performing the labour of unshipping, landing, carrying, and housing the goods of the South-sea company, the East India company, and all other goods, except from the East country, the produce of the British plantations and Ireland, and goods coastwise. They give bond for 500*l.* to make restitution in case of loss or damage, and are limited to rates regulated by the city of London.

PORTERS, *Ticket*, who are upwards of a thousand, are persons appointed by the city of London, and have granted to them the exclusive privilege of unshipping, landing, and housing pitch, tar, soap, ashes, wainscoat, fir, poles, masts, deals, oars, chests, tables, flax, and hemp, brought to England from the East country; also iron, cordage, and timber, and all goods of the produce of Ireland and the British plantations, and all goods coastwise (except lead). They give security in 100*l.* for fidelity, and have their names and numbers on a metal badge. In performing the labour of the port, if ticket-porters are not at hand, the tackle-porters may employ any person that offers.

PORTERAGE, a kind of duty paid at the Custom-house to those who attend the water-side, and belong to the package-office. These porters have tables set up, ascertaining their dues for landing of strangers' goods, and for shipping out the same. The charges of ticket porters, &c. are subject to regulations, which serve to prevent impositions, &c. See *COMPANY*.

By stat. 39 Geo. III. c. 58, it is enacted, that no inn-keeper, warehouse-keeper, or other person, to whom any box, basket, package, parcel, truss, game, or other thing whatsoever, not exceeding fifty-six pounds weight, or any porter or other person employed by such inn-keeper, warehouse-keeper, or other person, in the portage or delivery of any such box, parcel, &c. within the cities of London, Westminster, or Southwark, and their respective suburbs, and other parts contiguous, not exceeding the distance of half a mile from the end of the carriage pavement, in the several streets and places within the above-mentioned limits, shall ask or demand, or receive, or take, in respect of such portage or delivery, any greater rate or price than as follows:

	Distances.	
Not exceeding	a quarter of a mile,	three-pence.
Ditto ditto,	half a mile,	four-pence.
Ditto ditto,	one mile,	six-pence.
Ditto ditto,	one mile and a half,	eight-pence.
Ditto ditto,	two miles,	ten-pence.

For every further distance, not exceeding half a mile, three-pence additional.

Persons asking or receiving more than the above rates, shall, for every such offence, forfeit a sum not exceeding 20s. nor less than 5s.

Before any parcel shall be sent from the inn, warehouse, &c. there shall be made out and given to the porter, or other person employed in the delivery thereof, a card or ticket, whereon shall be distinctly printed, written or marked, the name and description of the inn, warehouse, or other place, from whence the same is sent, and the sum due for the carriage thereof, and also the sum due for the portage or delivery thereof, according to the rates above-mentioned, and the christian and surname of the porter or other person employed in such delivery, which card or ticket shall be delivered by the porter or other person employed with such parcel, under penalty not exceeding 40s. nor less than 5s.; and any porter not leaving such card or ticket, or wilfully altering, obliterating, or defacing the same, shall for every such offence forfeit 40s.; or any porter asking, demanding, or receiving any larger sum for the carriage of such article than is written or expressed as aforesaid, shall forfeit the sum of 20s. for every such offence.

Every parcel, &c. brought to any inn, warehouse, &c. by any public stage-coach or carriage, other than stage-waggons, for the purpose of delivery within the limits aforesaid (except where the same shall be directed to be left till called for), shall be delivered according to the direction thereof within six hours after its arrival at such inn, warehouse, or other place, unless such arrival shall be between the hours of four in the evening and seven in the morning, and in that case every such delivery shall be made within six hours after such hour in the morning, under penalty of any sum not exceeding 20s. nor less than 10s.

Every parcel, &c. brought to any inn, warehouse, &c. by any public stage-wagon, for the purpose of delivery within the aforesaid limits, except where directed to be left till called for, shall be delivered twenty-four hours after arrival, under penalty of not more than 20s. nor less than 10s.

Every parcel, &c. directed to be left till called for, shall, upon demand of the person properly authorised to receive the same, be delivered to such person without any charge or deduction whatsoever, other than what is justly due for the carriage thereof, and the additional sum of two-pence for the warehouse room thereof; and if the same be not delivered to such person upon such demand, or any charge other than as aforesaid be made or received in respect thereof, every inn-keeper, warehouse-keeper, &c. to whose inn, warehouse, &c. such parcel shall be brought, shall forfeit for every such offence or overcharge a sum not exceeding 20s. nor less than 10s.

If such parcel, &c. so left to be called for, be not sent for within one week after the same shall have been brought to such inn, the inn-keeper, warehouse-keeper, &c. may charge one penny *per* week for warehouse-room.

If any such parcel, &c. not directed to be left till called for, shall, before the same shall be sent for delivery from such inn, warehouse, &c. be demanded by any person lawfully authorised to receive the same, such parcel shall be thereupon delivered to such person so demanding the same; and it shall in such case be lawful for such inn-keeper, &c. to charge and take the sum justly due for the carriage thereof, and also the sum of two-pence for the warehouse-room thereof; but if the same be not delivered to such person on such demand, or any charge other than as aforesaid be made or received in respect thereof, such inn-keeper, ware-

house keeper, &c. shall forfeit for every such offence any sum not exceeding 20s. nor less than 10s.

For preventing misbehaviour in persons employed to deliver parcels or other things, upon any complaint made of any non-delivery, neglect, misconduct, or misbehaviour, in such employment, the parties offending may be brought before any justice of the peace within whose jurisdiction the offence has been committed, or the offender shall reside, who may impose a fine or penalty upon such porter or other person, not exceeding the sum of 20s. nor less than 5s.

Persons neglecting to pay to the porters, or other persons employed by them, the money justly due for carriage and portage, according to the above-mentioned rates, may be brought before a justice, who, upon proof made thereof upon oath, may award reasonable satisfaction to the party grieved, for his damage and costs, and for his loss of time in recovery of the same; and in case of non-payment the magistrate may levy the same by distress.

Informations of this act to be laid within fourteen days.

This act not to authorise the employment of any porter contrary to the usage of the city of London.

The remaining sections of this act relate to the recovery and application of penalties, enforcing the attendance of witnesses, allowing an appeal to the quarter-sessions, &c.

PORTERFIELD, in *Geography*, a small settlement of America, in York county and state of Maine, consisting of 272 inhabitants.

PORTERO, a river of Chili, which discharges itself into the sea, at the city of Maldivia.

PORTEROS, a small island in the Mediterranean, near the coast of France. N. lat. 43°. E. long. 6° 28'.

PORTES, PHILIP DES, in *Biography*, a French poet, who greatly improved the French language, and was presented by Henry III. with 10,000 crowns, on account of his great merit. Charles IX. gave him 800 crowns of gold for a poem; and admiral de Joyeuse conferred on him an abbey for a sonnet. He refused a bishopric that was offered him. He died in 1606, and was author of a translation of the Psalms; imitations of Ariosto; Christian poems; sonnets; elegies, &c.

PORTESIA, in *Botany*, so called in honour of a French physician and botanist of the name of Desportes, who wrote on the plants, as well as the diseases of Hispaniola, Juss. Gen. 265. See TRICHILIA.

PORTETE, in *Geography*, a harbour in the Caribbean sea, on the coast of Caraccas, having before it a rock of the same name. N. lat. 12°. W. long. 71° 16'.

PORTEUS, BELBY, in *Biography*, a late eminent prelate of the church of England, was born at York in the year 1731. His parents were natives of Virginia, in North America, who came to England in 1720, for the sake of obtaining a good education for their son. He was placed in a small school, from which he was removed to Rippon, where he became qualified for academical studies. He was entered at Christ's college in the university of Cambridge, where his attention, while he was an under-graduate, was directed principally to mathematical studies. In 1752 he was admitted to the degree of B. A., and in the same year he gained the second of two honorary medals, annually bestowed, as the reward of eminent classical literature. In the spring of the same year he was elected fellow of his college, and became a resident at Cambridge. His worth, as well as his talents, now began to be known, and in 1754 he was nominated one of the esquire beadles of the university, an office that was ill-suited to his turn of mind; but in consequence of the exertions of his friends, and his anxiety

anxiety to relieve his father from any farther expence, he accepted it, but he retained it not quite two years, having resolved to make up the deficiency in his income in a way more agreeable to himself, by taking private pupils. In 1755 he proceeded M. A., and two years afterwards he was ordained deacon. About the same time he was appointed one of the preachers at Whitehall chapel. It was not till 1759 that Mr. Porteus was known as an author. He then obtained a Seatonian prize for the best poetical "Essay on Death," which he published in conformity with the will of the founder. This was his first poetical essay, and it obtained for the writer a considerable portion of fame, and was regarded as a prelude to still greater celebrity. In this poem is the passage on WAR, that has been so frequently quoted, and which we shall introduce into our own pages.

" One murder makes a villain,
Millions a hero ; princes are privileged
To kill, and numbers sanctify the crime.
Ah ! why will kings forget that they are men ?
And men that they are brethren ? Why delight
In human sacrifice ? Why burst the ties
Of nature, that should knit their souls together
In one soft bond of amity and love ?
They yet still breathe destruction, still go on,
Inhumanly ingenious to find out
New pains for life—new terrors for the grave !
Artificers of DEATH ! Still monarchs dream
Of universal empire growing up
From universal ruin. Blast the design,
Great God of hosts ! nor let thy creatures fall
Unpitied victims at Ambition's shrine !"

On the demise of George II., Mr. Porteus wrote some verses on the occasion, which were excellent, and well received. His earliest prose publication was a sermon preached before the university of Cambridge, in the year 1761, entitled "The Character of David, King of Israel, impartially stated," intended to counteract the tendency of a publication, entitled "The History of the Man after God's own Heart," which exhibits David as an example of perfidy, lust, and cruelty, fit only to be ranked with the very worst of the Roman emperors. To this sermon the future fortunes of Mr. Porteus may be in a good measure attributed, for it immediately obtained for him the patronage of Dr. Thomas Secker, who had a few years before been translated from the bishopric of Oxford to the archiepiscopal throne of Canterbury. He was immediately appointed one of his lordship's domestic chaplains, who soon after presented him to two rectories in Kent and one in Middlesex, also to a prebendal stall in the cathedral church of Peterborough. In the year 1765 he married Miss Hodgson, a lady of some fortune, from Ashbourne in Derbyshire ; and in 1767 the rectory of Lambeth was bestowed upon him, and he was at the same time raised to the degree of doctor of divinity. On the death of the archbishop, in 1768, he, in conjunction with Dr. Stinton, edited and published his works, consisting of seven volumes ; to this was prefixed a life composed by Dr. Porteus, which obtained the praise of Dr. Johnson. Having now acquired considerable reputation as a preacher, and being highly spoken of for the excellence of his private character, the queen was pleased to become his patroness ; and in 1769, through her recommendation, he had the honour of being appointed chaplain to his majesty. Soon after, he became master of the hospital of St. Cross, near Winchester, dean of the chapel royal, and provincial dean of Canterbury. He is said to have assisted at the clerical meeting held at the Feathers tavern, London, in

1772, in which it was determined to petition the legislature for relief from subscription to the thirty-nine articles. The fact, however, is doubted, and with more probability it is stated that he was a member of another assembly that met at Tennison's library, with a view "to request a revival of the articles of liturgy, and forms of subscription," but they judged it fitting to consult first their spiritual superiors, and to be directed by them. Upon application to the archbishop of Canterbury, Dr. Cornwallis, he replied, that he would lay their wishes before his brethren. When the archbishop afterwards informed them that it was the opinion of his brethren, "that it was neither prudent nor safe to do any thing in the matter," Dr. Porteus and his associates readily acquiesced in the judgment of the governors of the church, contenting themselves with circulating a printed paper to inform the clergy what had been done, that they might not suppose the matter was wholly dropped.

About this time Dr. Porteus made great exertions in a cause not at all deserving of the zeal which he manifested in it. This was to set apart, as a day of fasting, Good Friday. He was, however, in a good measure successful, and the labours of the loom and the field have been suspended in many parts of the kingdom, on every successive Good Friday from that time to the present. This, if we understand the Christianity of the New Testament, is contrary to the injunctions of our holy religion ; and it is certainly in hostility to good policy in a national point of view. It was, however, so well received by the court, that he was immediately raised to the bishopric of Chester, through the influence of her majesty, whose bishop he was at this time emphatically called.

This effort for reviving the strict observance of an old popish fast-day, was by many, as well as her majesty, highly commended, as a pious endeavour to restore the purity of ecclesiastical discipline, and to promote the vital interests of Christianity, while others as loudly condemned it, as calculated to serve the cause of superstition and fanaticism. It called forth a very able pamphlet from the Rev. Robert Robinson, entitled "The History and Mystery of Good Friday," in which the writer's learning, argumentative powers and humour, were displayed to great advantage. In the year 1779, the bill for the relief of Protestant dissenting ministers and schoolmasters was brought into the house of lords, and bishop Porteus concurred in the unanimity with which it passed, and has left it on record that he considered it to be "a measure, no less consonant to the principles of sound policy, than to the genuine spirit of the gospel." In 1783 our prelate published a "Volume of Sermons" on various subjects, which soon passed through several editions. In the same year, being called to preach before the Society for propagating the Gospel in Foreign Parts, his lordship took the opportunity to plead the cause of the wretched African negroes, and when it was afterwards brought before the legislature, he steadily supported the repeated efforts which were made on their behalf by the advocates of justice and humanity, till he had the happiness of seeing the result of their labours, viz. the statute for the abolition of the slave trade. He took an active part also in the establishment of Sunday schools, an object that owed much to his recommendation, and was greatly forwarded by his zeal.

Upon the death of the learned and excellent bishop Lowth, in 1787, Dr. Porteus was translated from the see of Chester to that of London ; and in 1790 he made the primary visitation of his new diocese, and published the charge which he delivered on the occasion, in which he strongly pointed

out the necessity of an attention in the clergy to their personal duties, and exposed the criminality of non-residence on their cures. In 1794 he published a second volume of sermons, which, like the former, was well received by the public. During the Lent of 1798, he commenced a series of discourses on the truth of the gospel history, and the divinity of our Lord's mission, which he delivered every Friday at St. James's church, Westminster, to crowded audiences. These discourses were continued during Lent in some succeeding years, and were in 1802 published under the title of "Lectures on St. Matthew's Gospel," in two vols. 8vo. Previously to this Dr. Porteus had published "A Summary of the principal Evidences of the Truth and divine Origin of the Christian Revelation, designed chiefly for the Use of young Persons," in which he has compressed into a narrow compass the most forcible arguments for the truth of Christianity, that are, for the most part, to be found in our best writers, with additional observations of his own. We must notice another small tract which his lordship published in the year 1806, entitled "The beneficial Effects of Christianity on the temporal Concerns of Mankind, proved from History and Facts." This, like the bishop's other works, is an impressive and very useful tract. Dr. Porteus had for some years been subject to ill health, which at length brought on a general debility, and on the 14th of May, 1808, he sunk under the pressure of accumulated disease, being in the 78th year of his age. He left behind him a justly acquired reputation for propriety of conduct, benevolence to the clergy, and a strict attention to episcopal duties. As a preacher, he obtained the character of an accomplished orator; his language was chaste; his manner always serious, animated, and impressive, and his eloquence captivating. He seemed to speak from conviction, and being fully persuaded himself of the truth of those doctrines which he inculcated, he the more readily persuaded others. In private life he was mild, affable, easy of access, irreproachable in his morals, of a cheerful disposition, and ever ready to listen to and relieve the distresses of his fellow creatures. In his behaviour towards dissenters from the established church, he discovered great moderation and candour. He, probably, was a sincere believer in the leading doctrines contained in the thirty-nine articles, but could make allowance for those who did not exactly come up to the same standard. Toward the latter part of his life, he was accused of becoming the persecutor of the Rev. Francis Stone, a clergyman of his own diocese, against whom he formally pronounced a sentence of deprivation for preaching and publishing a sermon in direct hostility to the doctrines of the church to which he belonged. Mr. Stone had for many years avowed his disbelief of the articles of faith which he had engaged to defend, and for the support of which he had long received a handsome income, but no notice whatever was taken of the unsoundness of his creed. He preached the offensive sermon before many of his brethren of different ranks in the church, yet we have good reason to believe that this attack, which could scarcely be deemed prudent or even decent, would have been unnoticed, had he contented himself with promulgating his opinions from the pulpit only; but when he made the press the vehicle of disseminating opinions contrary to the articles of his church, the prelate was goaded on to the part which he took, and which, perhaps, was not in the least unbecoming the high office which he held. Every beneficed clergyman, not tacitly, but avowedly, undertakes the performance of certain duties, on account of which he receives the annual stipend; if, therefore, he ceases to perform those duties, it may be thought by some that he gives up his claim to the remuneration. This, however, is a subject which involves in it a variety of considerations, which we have neither leisure nor inclination to

discuss. But, if we have been rightly informed, Mr. Stone obtruded himself without necessity upon the public notice; and those who applaud his integrity have blamed his imprudence. His friends pitied and relieved him; but death has terminated his humiliation and suffering.

As a lord of parliament, Dr. Porteus, we suspect, uniformly voted with the minister, and as such supported that system of war and bloodshed which he had so finely deprecated in his poem on DEATH. It was on one of the debates in the house of peers in 1794, that the lines already quoted were repeated in that house, as supposed to come from his pen, and his lordship was asked by a noble earl, then accustomed to stand alone in the discussions of the house, if he were really the author of those excellent lines, to which the bishop replied, "They, my lord, were not composed for the present war."

The benefactions of the bishop of London were numerous, public as well as private. While he was living, he transferred nearly seven thousand pounds in three *per cents* to the arch-deacons of the diocese of London, as a permanent fund for the relief of the poorer clergy of his diocese. He also transferred stock to Christ's college, Cambridge, directing the interest arising from it to be appropriated to the purchase of three gold medals, to be annually contended for by the students of that college: one medal, value fifteen guineas, for the best Latin dissertation on any of the chief evidences of Christianity: another of the same value for the best English composition on some moral precept in the gospel; and one of ten guineas, to the best reader in and most constant attendant at chapel. He bequeathed his library for the use of his successors in the see of London, together with a liberal sum towards the expence of erecting a building for its reception at the episcopal palace at Fulham. At Hyde-hill, near Sundridge, in Kent, where the bishop had a favourite rural retreat, he built a chapel, under which he directed his remains to be deposited, and he endowed it with an income of 250*l.* a-year. Hodgson's Life of Porteus. Monthly Mag. vol. xxvii. Gent. Mag. for 1809.

PORT-FIRE, a paper tube, about ten inches long, filled with a composition of meal-powder, sulphur, and salt-petre, rammed moderately hard; used to fire guns and mortars instead of match.

These port-fires are distinguished into wet and dry; the composition of wet port-fires is four parts of salt-petre, one of sulphur, and four of mealed powder; when the composition is well mixed and passed through a sieve, it is moistened with a little linseed-oil, and well rubbed with the hands, till the oil is thoroughly mixed with the other ingredients.

The composition of dry port-fire is four parts of salt-petre, one of sulphur, two of mealed powder, and one of antimony. These compositions are driven into small paper cases, and so kept till they are used.

PORT-GLAIVE, *Sword-bearer*, an order of knights in Poland, called by the Latins *ensiferi*.

It was confirmed by pope Innocent III., and by him sent into Livonia to defend the preachers of the gospel against the infidels at the first conversion of that country. Being too weak to effect that business, they united themselves with the Teutonic, or Marian knights, by the pope's authority; and, instead of knights of the sword, were called *knights of the cross*. They separated again under Univivus, their great master, anno 1541; or, according to others, in 1525. The Teutonic knights being then dispossessed of Prussia, the Port-glaives, going into Luther's opinions, soon dwindled away; for in the year 1557 they fell out with the bishop of Riga, of the house of Brandenburg, because he

would not embrace their notions; and he, to secure his own estate, put Riga into the hands of the Polanders.

Afterwards, the knights, having had most of Livonia taken from them by the Muscovites, put themselves under the protection of Sigismund Augustus, king of Poland, anno 1559; but William of Furstemburg, their great master, being betrayed by his own mercenaries into the hands of the Muscovites, Gothard Ketler, his successor, followed the example of Albert, the great master of Prussia, transacted with the aforesaid Sigismund for the whole estate, which he surrendered to his own use in the castle of Riga, together with his cross, the seal of the order, the charters and grants of the several popes and emperors, which concerned the same; as also the keys of the city and castle of Riga, the office of great master, the rights of coinage, and all the powers and privileges appertaining to it; receiving back again from Radzivil, the king's commissioner, the dukedom of Courland to him and his heirs for ever.

PORTGLENONE, in *Geography*, a post-town of the county of Antrim, Ireland, situated on the river Bann, over which it has a bridge. It is 105 miles N. from Dublin, and 13 N.W. from Antrim.

PORT-GREVE, or PORTGRAVE, was anciently the principal magistrate in ports, and other maritime towns.

The word is formed from the Saxon *port*, a port, or other town, and *gerefa*, a governor. It is sometimes also written *port-reve*.

Camden observes, that the chief magistrate of London was anciently called *port-greve*; instead of whom, Richard I. ordered two bailiffs; and soon afterwards king John granted them a mayor for their yearly magistrate. The charter of William the Conqueror to the city of London runs thus: "William king, grete William bishop, and Godfrey port-greve, and all the burges within London, French and English. I grant you, that I will that ye be all your law-worth that ye were in Edward's day the king. And I will that each child be his fader's eyer, and I will not suffer that ony man you any wrongs breed, and God you keepe."

PORTHDINLLEYN HEAD, in *Geography*, a cape or promontory of North Wales, in the county of Caernarvon; six miles west of Pwllhely. N. lat. $52^{\circ} 58'$. W. long. $4^{\circ} 47'$.

PORT-HOLES, or PORTS, in a *Ship*, are the embrasures, or holes, in the sides of a ship of war, in which the artillery is ranged in battery upon the decks above and below.

The ports are formed of a sufficient extent to point and fire the cannon, without injuring the ship's side by the recoil; and accordingly the shipwrights cut them in proportion to the size of the cannon. The lower and upper edges of the ports are always parallel to the deck, so that the guns, when levelled in their carriages, are all equally high above the lower extremity of the ports, which is called the *port-cells*.

Large ships have three rows of port-holes, or batteries; each usually consisting of fifteen port-holes.

In storms, they use to shut up the port-holes, to prevent the water's driving through them.

In English, Dutch, and French ships, their valves, or casements, called port-lids, are fastened by hinges at top of the apertures; in Spanish vessels aside of them.

PORT-HOOKS, in *Ship-building*, iron hooks driven into the side of the ship, over the ports, to which the port-hinges are attached.

PORTHORION ROAD, in *Geography*, a bay in the Irish sea, near the S.W. extremity of the county of Caernarvon.

PORTHYNON POINT, a cape of South Wales, in the county of Glamorgan; 6 miles S.S.W. of Penrice.

PORTICA TERRA, in *Ancient Geography*, a country of India, towards the mouth of the river Indus. Diod. Sic.

PORTICELLO, in *Geography*, a bay on the W. coast of Sardinia. N. lat. $40^{\circ} 40'$. E. long. $8^{\circ} 20'$.

PORTICI, a small town of Italy, about six miles from Naples, on the sea-shore, at the foot of Vesuvius. Its principal ornament is a royal palace. Under this town and palace lies buried, at the depth of 70 feet under accumulated beds of lava, the city of "Herculaneum," the first victim of the fires of Vesuvius. Under the article HERCULANEUM we have stated, that the prince d'Elbœuf, after the first discovery was made by accident, purchased the spot, and continuing the excavations that had been begun, discovered various statues, pillars, and even a whole temple of the finest marble, adorned with statues. Upon the interposition of the Neapolitan government the work was stopped for 20 years; however, the excavations were occasionally continued, and a basilica, two temples, and a theatre, were successively discovered and stripped of their numerous pillars and statues. Streets were observed, that were paved and flagged on the sides, and private houses, and even monuments explored. A prodigious number of statues of bronze, of different sizes, pillars of marble and alabaster, and paintings and mosaics, many of them entire and in high preservation, others fractured and damaged, have been drawn from the edifices of this subterraneous city, and give a high idea of its opulence; to these we may add many species of ornaments used in dress, of weapons and armour, of kitchen utensils and domestic furniture, of agricultural and chirurgical instruments. The theatre is at present the only part open to inspection. Of all the articles drawn from Herculaneum, the most curious and valuable are the MSS. Of these many dissolved into dust as soon as they were exposed to the air: while others, though scorched or rather burnt, resist the action of that element. The number of the latter, as it is conjectured, may be about 1800. The first MSS. that have been unfolded were Greek, and as Herculaneum was known to be a Greek city, it was presumed that the whole collection was in that language: but several Latin works have been found since, and there is every reason to believe that in a city so rich, and inhabited by so many wealthy Romans, there must have been considerable libraries, both public and private, and of course complete collections of Roman authors.

The mode of unrolling these MSS. was invented by a priest of the congregation of the Somaschi (a body of clergy who devote themselves entirely to the education of youth); but as the government of Naples, though it employed him and an assistant whom he instructed in the process, did not give much encouragement to the undertaking, the work languished, and the MSS. long remained a neglected treasure. At length the prince of Wales (now prince regent), with a munificence that does equal honour to his taste and his public spirit, undertook to defray the expence, and selected a person not only qualified for the task by his deep and extensive information, but peculiarly adapted to it by his zeal and perseverance. This gentleman is Mr. Hayter, a clergyman of the church of England, who, being established at Portici, has superintended the process of unfolding the papyri with indefatigable assiduity. The nature and difficulty of the undertaking, and the want of competent assistants, render its progress slow and almost imperceptible; and therefore centuries must probably elapse before the MSS. now in hand can be unrolled, and their contents given to the public. To which we may add, that such is the extreme frailty of the papyri themselves, that with all the care and precaution imaginable, not one probably can escape

escape mutilation, and pass through the process without some detriment, or rather without material defalcation. Eustace's Classical Tour through Italy, vol. i.

PORTICO, in *Architecture*, a kind of gallery on the ground; or a piazza encompassed with arches supported by columns, where people walk under cover.

The roof is usually vaulted, sometimes flat. The ancients called it *lacunar*; which see.

Though the word portico be derived from *porta*, gate, door, yet it is applied to any disposition of columns which form a gallery without any immediate relation to doors or gates.

The most celebrated porticos of antiquity were those of Solomon's temple, which formed the atrium or court, and encompassed the sanctuary; that of Athens, built for the people to divert themselves in, and in which the philosophers held their disputes and conversations; which occasioned the disciples of Zeno to be called *stoics*, from the Greek *στοιχος*, *porticus*; and that of Pompey at Rome, raised merely for magnificence, consisting of several rows of columns supporting a platform of vast extent; a draught of which Serlio gives us in his views of antique buildings.

Among the modern porticos, the most celebrated is the piazza of St. Peter of the Vatican. That of Covent Garden, London, the work of Inigo Jones, is also much admired.

PORTICOS were numerous buildings erected in Rome for the convenience of the public in sultry or inclement weather; and they are thus distinguished from those which formed the vestibules or decorated the entrance of temples. Of these we shall mention some of the principal: the *porticus duplex*, so called from its double row of pillars, was erected by Cneius Octavius, after the defeat of Perseus; it was of the Corinthian order, and ornamented with brazen capitals; the walls were decorated with paintings representing the achievements of the founder. It stood near the "Circus Flaminius." The *portico of Pompey*, annexed to his theatre, was supported by 100 marble columns; it opened on both sides into groves of plane trees, and was refreshed by fountains and streams, and in summer time it was the favourite resort of the young, the gay, and the gallant. Augustus erected several porticos, and prompted by his example, several of his most distinguished and opulent friends vied with each other in similar works of magnificence. Among the former were the porticos of Caius and Lucius, with a basilica annexed to it; that of Octavia, which rose near the theatre of Marcellus, and contributed not a little to its beauty as well as convenience; that of Livia, near the Roman forum. This latter was ornamented with a collection of ancient pictures, and shaded by a vine of prodigious luxuriance. Ovid alludes to it in his usual lively manner. But this and every edifice of the kind prior to this era, was eclipsed by the splendour of the *Palatine portico*, dedicated to Apollo. It was supported by pillars of Numidian marble, enlivened with exquisite paintings and statues, and emblazoned with brass and gold. It inclosed the library and temple of Apollo, so often alluded to by the writers of the Augustan age, and was deservedly ranked among the wonders of the city. It is described by Propertius, lib. xi. 81.

Another portico, erected by this emperor, was called *Ad nationes*, from the statues with which it was furnished, representing various nations in their respective habits. It was perhaps still more remarkable for a statue of Hercules, lying neglected on the ground, though it had been brought from Carthage, and was that to which the Carthaginians were accustomed to offer human victims: "Sacrum," as Livy remarks, "minime Romanum." The *Porticus Septo-*

rum was finished or repaired by Agrippa, as Pliny says, and inclosed not the "Septa tributa Comitii," where the people assembled to vote, but "Diribitorium," or place where the legions were mustered and paid. These edifices were all of marble, and the latter in particular unusually magnificent. Agrippa also built and gave his name to another portico, which, as some suppose, was connected with the present portico of the Pantheon, and carried around it. But as he had erected "Thermæ," and other noble fabrics near that edifice, it is more probable that his portico inclosed the whole, and united them together in one grand circumference. That it was extensive is evident from Horace, who represents it as a public walk, much frequented. The materials were, as in all Agrippa's works, rich marbles, and the ornaments paintings and statues. The portico of *Hercules*, or of *Philippus*, was so called because it was rebuilt by the latter at the instigation of Augustus, and dedicated to Hercules, whose temple it inclosed, under the appellation of "Musagetos," a leader of the Muses. It was erected solely for the ornament of the city, and of course was decorated with an unusual profusion of splendid objects; the paintings of Apelles, Zeuxis, and Antiphilus, forming part of its furniture. Several porticos took their names from the temples to which they were annexed, and seem to have formed either vast squares or courts before, or immense galleries round their respective temples, thus detaching them from ordinary buildings, and giving them a distinguished and solitary grandeur. The portico of *Quirinus*, and that of *Europa*, are mentioned by Martial as fashionable places of resort, and must consequently have been very spacious. That of *Isis* was remarkable not only for paintings but mosaics. We shall here add, that the approach to the curiæ, the basilicæ, the forums, was generally by porticos; that several ranges of porticos led to the Capitol, and lined the sides of the declivity; that the Campus Martius was surrounded by an uninterrupted colonnade; that almost every emperor distinguished himself by the erection of a new edifice of the kind; and that Nero is said by Suetonius to have lined the streets of Rome (those probably which he himself had rebuilt,) with a continued portico. Several porticos were erected by latter emperors of astonishing extent; such were that of Gallienus, extending nearly two miles along the Via Flaminia; and that of Gordian in the Campus Martius, which was a mile in length, and formed of one range of pilastres and four of columns, opening upon plantations of box, cedar, and myrtle.

PORTILLA, in *Geography*, a town of Spain, in the province of Leon; 10 miles E.S.E. of Valladolid.

PORTIO, **PORTION**, a part or division of any thing.

PORTIO dura, and *mollis*, in *Anatomy*, a partition of the fifth pair of nerves of the brain; which, before its egress out of the dura mater, is apparently divided into two branches; the one pretty tough and firm, called portio dura; the other soft and lax, called portio mollis. See **NERVES**.

PORTION, in the *Canon Law*, is that allowance, or proportion, which a vicar ordinarily has out of a rectory, or impropriation; be it certain or uncertain.

PORTIONER, **PORTIONARIUS**. Where a parsonage is served sometimes by two, sometimes by three ministers, alternately; as Bromyard, Burford, &c. in Shropshire; the vicars or incumbents are called portioners, because they have but their portion or proportion of tythes, or profits of the living.

PORTISCULUS, among the Romans, an officer who had the direction of the rowers in a galley. He was otherwise called *pausarius* and *hortator remigum*.

PORTISHEAD POINT, in *Geography*, a cape of England, on the N.W. coast of the county of Somerset, on the Severn; three miles S.W. from the mouth of the river Avon. N. lat. $51^{\circ} 28'$. W. long. $2^{\circ} 56'$.

PORTIUS PISCIS, in *Ichthyology*, a name given by some to a fish called by others the *mugil ater*, or black mullet. It is a very scarce fish, much resembling the common mullet in shape, but all over of a fine black, and having several lines of a deeper black than the rest, running longitudinally from the gills to the tail; it has a very wide mouth, and has seven or eight prickles on the back, separate from one another, and joined into a fin by a membrane in the usual way; these are placed immediately before the back-fin.

PORTLAND, in *Geography*, a post-town and port of entry of America, in Cumberland county and district of Maine; being the largest town of that district; situated on a promontory in Casco bay, and formerly a port of Falmouth: 50 miles S. by W. of Wiscasset, and 123 from Boston. In July 1786, this part of the town, being the most populous and mercantile, and seated on the harbour, together with the islands which belong to Falmouth, was incorporated by the name of Portland. Its harbour is safe and capacious, seldom or never completely frozen over; near the main ocean, and easy of access. The inhabitants carry on a considerable foreign trade, build ships, and are much occupied in the fishery; so that it is reckoned one of the most thriving commercial towns in the commonwealth of Massachusetts. In 1775 it was laid in ashes by the British fleet; but it has since been entirely rebuilt, and by the last census contained 7169 inhabitants. Among its public buildings are seven churches, three for Congregationalists, one for Episcopalians, one for Baptists, one for Methodists, and one for Friends, and a handsome court-house. A light-house was erected in 1790, on a point of land called Portland head, at the entrance of the harbour; the capital of its bank is 300,000 dollars. N. lat. $43^{\circ} 39'$. W. long. $69^{\circ} 52'$. The works erected in 1795 for the defence of Portland consist of a fort, a citadel, a battery for ten pieces of cannon, an artillery store, a guard-house, an air-furnace for heating shot, and a covered way from the fort to the battery. Morse.

PORTLAND Isle, a small island, or rather a peninsula, in the liberty of Portland, Dorchester division of the county of Dorset, England, is situated in the English channel, nearly opposite to Weymouth, at the distance of 15 miles from Dorchester, and 133 miles S.W. by W. from London. It is connected with the mainland by a ridge of pebbles, which extend nearly seventeen miles along the coast, and from which it is separated by a narrow arm of the sea, called the Fleet. The etymology of the name Portland is uncertain; some deriving it from *Port*, a Saxon free-booter, who is said to have settled here A.D. 501, and others from the proximity of the isle to the port of Weymouth. This spot is early noted in history, and has been the scene of several important transactions in the military annals of England. Baxter conjectures that it was the Vindelis, or, as he writes it, the Vindenis of Antoninus. In the year 787, a party of the Danes landed here, and put to death the governor, Præpositus, or Gerela, who commanded for Bithric, king of the West Saxons. In 1052 it was again seized upon and plundered by Godwin, the banished earl of Kent.

Portland isle had been fortified with a castle before the year 1142, as in that year it was taken possession of by Robert, earl of Gloucester, in the name of the empress Maud, the governor having espoused her cause in the contest for the throne against the usurper Stephen. This castle is now an inconsiderable ruin, but was doubtless formerly of great ex-

tent; and was distinguished for the unusual boldness and romantic appearance of the rock on which it stood. When it was dismantled does not appear upon record. It is reasonable, however, to conclude, that its demolition preceded the erection of the present fortress, called Portland castle, by king Henry VIII. This fortress is of great strength, and completely commands Weymouth road, with a view to which object it was originally constructed. It is the residence of the governor during his visits to the peninsula. In the time of the grand rebellion, it was garrisoned at first for the parliament; but having been taken through stratagem by a party of the king's forces, it was among the last which was compelled to abandon the royal cause.

Portland isle extends about four miles and a half in length, by two in breadth; and in a mineralogical point of view, may be regarded as one continued mass of freestone rock. This, however, is frequently intersected by strata of black and red schistus, and of a species of stone called sugar-candy stone; and is also interspersed with a great variety of petrified shells, among which are some *cornua ammonis*. From many indubitable marks still remaining, as well as from history, we learn that this isle has sustained frequent convulsions of nature. In 1665 the great pier was entirely demolished, and the channel filled up with rubbish: the roads leading from the piers to the quarries were destroyed, and nearly 100 yards of earth slid into the sea. In December 1734, about 150 yards on the east side of the isle likewise gave way, and fell into the ocean, occasioning by the shock huge chasms, in one of which, between the pier and the castle, several large skeletons were discovered, buried between stones set edge-ways, with another superincumbent. But the greatest slide occurred in 1792, and is thus described in Hutchins's History of Dorsetshire. "Early in the morning the road was observed to crack: this continued increasing, and before two o'clock the ground had sunk several feet, and was one continued motion; but attended with no other noise than what was occasioned by the separation of the roots and brambles, and now and then a falling rock. At night it seemed to stop a little, but soon moved again; and before morning, the ground, from the top of the cliff to the water side, had sunk in some places fifty feet perpendicular. The extent of ground that moved was about a mile and a quarter from north to south, and 600 yards from east to west."

This isle constitutes only one parish, but contains several considerable villages or hamlets. According to the parliamentary returns of 1811, the houses amounted to 383, and the inhabitants to 2079 in number. There is but one church in the whole island, which was lately erected in lieu of an old one now in ruins. The agricultural produce on the arable lands here is wheat, oats, pease, and barley: and about three thousand sheep are kept on the pasture-grounds. The corn is of an excellent quality; and the sheep, of a peculiarly small breed, have been long famous for their delicacy of flavour. Most of the husbandry concerns in Portland are managed by the women, the men being chiefly engaged in the quarries, which are scattered, more or less, over every part of the isle, and produce the celebrated free-stone, which bears its name. This stone was first brought into repute in the reign of James I., who employed it, by the advice of his architects, in the construction of the banquetting-house at Whitehall; and it has since been used in the erection of almost all the public edifices of note in the English metropolis. The principal quarries are situated near the village of Kingstons, where there is a pier, whence upwards of 6000 tons of stone are shipped annually. The method of conveying the blocks from the quarries to the shore is simple and easy.

As the navigation in the vicinity of Portland is extremely dangerous, two light-houses have been erected on the island. One of these was constructed in 1716, and the other in 1789. The latter was built by William Johns, architect of Weymouth, at the expence of the Trinity corporation, and is a circular cone structure, sixty feet in height, situated at the distance of 1608 feet from the shore, which here exhibits a remarkable cavern, called Cave-hole, about fifty feet square, and twenty-one deep at the entrance. About twenty years ago, a vessel of 40 tons burthen was driven into this cavern, and dashed to pieces; and smaller craft frequently share the same fate. How far it penetrates under the land has not hitherto been ascertained; but on the west side it appears to separate into two apartments.

The manor of Portland, in the time of the Saxon dynasty, belonged to the crown; and was granted by Edward the Confessor to the church of Winchester. It seems, however, again to have reverted to the crown, before the compilation of the Domesday book, as it is there mentioned under the title of *Terra Regis*, and is said to have yielded sixty-four pounds of pure silver. By Henry I. it was re-granted to the church of Winchester. In the reigns of Edward IV. and Richard III. it had again become royal property; and was first granted to Cecilia, duchess of York, and afterwards to George, duke of Clarence. Henry VIII. bestowed it successively on his queens, Catharine Howard and Catharine Parr. In the reign of James I. it was given to the princess, afterwards queen Anne; and remained in the possession of the crown till 1800, when it was sold by public auction.

The custom of gavel-kind has prevailed from time immemorial in this district, as has likewise another very singular custom, (resembling the American one of bundling,) called by the natives *Portland-custom*. Here the women never marry before they have become pregnant by their intended husbands. Should this not happen after a limited period of cohabitation, the parties are supposed not to have been destined for each other by providence, and the match is consequently broken off; and that without any imputation on the character of the female, who as readily obtains another suitor, as if she had never cohabited with man.

The *Chefil-Bank*, connected with the mainland, says Dr. Maton, is "one of the most extraordinary ridges, or shelves, of pebbles in Europe, and perhaps the longest, except that of Memel, in Polish Prussia." As already mentioned, it extends about seventeen miles in length, and in most places nearly a quarter of a mile in breadth, a narrow arm of the sea interposing between it and the southern coast of England. The pebbles forming this immense barrier consist chiefly of a white calcareous kind; but there are many of quartz, jasper, chert, and other substances. What is singular, they gradually diminish in size, from the Portland end of the bank to that which attaches to the mainland; and are, throughout its whole extent, so loosely thrown together, that horses' legs sink almost knee deep at every step. Several ingenious theories have been advanced to account for the formation of this curious work of nature; but they have hitherto been accounted unsatisfactory. It is a problem of no very easy solution. History and Antiquities of Dorsetshire, 3 vols. folio, by the Rev. John Hutchins, and Richard Gough. Maton's Tour to the West of England, 2 vols. 8vo. Beauties of England, vol. iv., by John Britton and E.W. Brayley.

PORTLAND Canal, an inlet on the W. coast of North America, extending about 70 miles to the north. S. lat. 54° 42'. Long. of the entrance 229° 42' E.

PORTLAND Creek, a small bay on the W. coast of Newfoundland.

PORTLAND Island, an island in the South Pacific ocean, near the E. coast of New Zealand, visited by Capt. Cook in 1773. S. lat. 39° 25'. E. long. 178° 12'.—Also, one of the cluster called Queen Charlotte's islands, in the South Pacific ocean, of a triangular figure, and about eight miles in circumference. S. lat. 10° 43'. E. long. 164° 15'.

PORTLAND Islands, a cluster of small islands in the East Indian ocean, W. of New Hanover, so named by Capt. Carteret in 1767; about six or seven in number, and appearing to be fertile. S. lat. 2° 27'. E. long. 148° 3'.

PORTLAND Key, a small island near the S. coast of the island of Jamaica; two miles E. from Portland Point, which is a cape of Jamaica. N. lat. 17° 44'. W. long. 76° 57'.

PORTLAND Point, a cape in Hudson's Bay. N. lat. 58° 50'. W. long. 78° 20'.

PORTLAND Stone, *Saxum Arenarium Portlandicum* of Da Costa, and *Pseudurium Hebes, Albidum, Laxius*, of Hill, is an alkaline sand-stone, of a dull whitish colour, heavy, moderately hard, of a somewhat flat texture, and is composed of a large roundish grit, cemented together by an earthy spar, and intermixed with numerous glittering spangles of pure spar; the grit splits in the cutting of the stone, so that it is capable of being brought to a surface very smooth and equal; it will not strike fire with a steel, and burns to a slight ashen hue. The Portland stone belongs to the third variety of the compact limestone, under the calcareous genus, whose fracture is earthy, according to Kirwan's arrangement. Its specific gravity is 2.461. There are vast quarries of it in the island of Portland, in Dorsetshire, whence its name. It is brought from thence in large quantities to London, and much used in building. This and all similar sorts of stone, that are composed of granules, and are not of a laminated texture, will cut and rive in any direction, as well in a perpendicular, or in a diagonal, as horizontally and parallel to the site of the strata. For this reason they have obtained the name of *free-stone*. Da Costa's Fossils, p. 125.

This stone is very soft when it comes out of the quarry, works very easily, and becomes in time very hard. The piers and arches at Westminster bridge are built with it.

PORTLAND's Powder for the Gout and Rheumatism. See GOUT.

PORTLANDIA, in Botany, was so named by Dr. Patrick Browne, in compliment to the late Margaret duchess dowager of Portland, a lady long celebrated for her knowledge and patronage of various branches of natural history, especially of conchology, and who cultivated, in her garden at Bulstrode, a rare collection of English as well as exotic plants, with which she was scientifically conversant. See our biographical article of the Rev. JOHN LIGHTFOOT.—Browne Jam. 164. Linn. Gen. 91. Schreb. 121. Willd. Sp. Pl. v. 1. 935. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 367. Juss. 202. Lamarek Illustr. t. 162. Gært. t. 31. (Coutarea; Aubl. Guian. v. 1. 314. Juss. 202.)—Class and order, *Pentandria Monogynia*. Nat. Ord. *Rubiaceæ*, Juss.

Gen. Ch. *Cal.* Perianth superior, of five, sometimes four or six, oblong-lanceolate permanent leaves. *Cor.* of one petal; tube much longer than the calyx, funnel-shaped, somewhat inflated; limb shorter than the tube, in five, sometimes four or six, deep, broad, acute segments. *Stam.* Filaments as many as the segments of the corolla, inserted into

into the base of its tube; anthers terminal, linear, erect, as long as the corolla. *Pist.* Germen inferior, roundish, with several angles; style simple, the length of the stamens; stigma oblong, obtuse. *Peric.* Capsule obovate, angular, abrupt, of two cells, finally separable from the top downwards into two parts, contrary to the partition. *Seeds* numerous, roundish, compressed, imbricated, more or less bordered.

Eff. Ch. Corolla funnel-shaped, inflated. Anthers longitudinal. Capsule angular, abrupt, with two cells and many seeds, crowned with the permanent calyx.

1. *P. tetrandra*. South sea Portlandia. Linn. Suppl. 143. Willd. n. 1. Forst. Prodr. 15.—Flowers four-cleft, with four stamens. Calyx awl-shaped. Leaves obovate, obtuse.—Native of several islands in the South seas, where it has, according to the Linnæan and Banksian collections, been gathered by Forster, Cook, and David Nelson. A figure in outline exists among the unpublished plates, which Sir Joseph Banks has caused to be engraved from Forster's sketches, but we know of no other. The *stem* is shrubby, with rugged branches. Every part of the plant is smooth. *Leaves* about the ends of the branches, opposite, crowded, stalked, broadly obovate, obtuse, entire, coriaceous, about three inches long. *Stipulas* short, annular, intrafoliateous. *Flowers* axillary, solitary, on stalks about an inch long. *Corolla* white, longer than the leaves, with a rather slender tube, and short dilated limb. The *calyx-leaves* are awl-shaped. *Fruit* with a ribbed soluble coat, which leaves the two cells entire, till they split of themselves and discharge the seeds.

2. *P. grandiflora*. Large-flowered Portlandia. Linn. Sp. Pl. 244. Willd. n. 2. Ait. n. 1. Browne Jam. t. 11. Sm. Ic. Pic. t. 6. Curt. Mag. t. 286. Schneev. Ic. t. 4.—Flowers five-cleft, with five stamens. Calyx ovate. Leaves elliptical, acute.—Native of rocky places at the foot of mountains in Jamaica. It is said to have been introduced into England, in 1775, by Mr. Ellis, a gentleman long resident in that island, distinguished for his love of natural history. We have never seen this noble and elegant plant in perfection, except in the late marchioness of Rockingham's garden, at Hillingdon, where it flourished exceedingly in a small, low, very hot stove, and bore frequently near twenty flowers at a time, chiefly in the summer months. The *stem* is shrubby, but weak, and trailing along the rocks, smooth. *Leaves* opposite, on short stalks, elliptical, pointed, channelled, entire, of a fine dark shining green, very smooth, a span long. *Flowers* white, rather longer than the leaves, axillary, solitary, highly fragrant, expanding near three inches; their tube angular, buff-coloured in the bud. *Calyx-leaves* ovate, tinged with red, veiny.—Jacquin's plant, Amer. 62, t. 44, is probably the same with our's, though he erroneously represents the leaves as unequal at the base.

3. *P. coccinea*. Scarlet Portlandia. Swartz Ind. Occ. v. 1. 384. Willd. n. 3.—Flowers five-cleft, with five stamens. Calyx lanceolate. Leaves ovate, coriaceous.—Found by Dr. Swartz on mountain precipices in the western part of Jamaica, but rarely. This is smaller than the last in all its parts, with rounder, more ovate *leaves*, and deep-scarlet *flowers*, whose *corolla* is not half so long as that of the *grandiflora*.

4. *P. hexandra*. Laurel-leaved Portlandia. Linn. Mant. 45. Willd. n. 4. Ait. n. 2. Jacq. Amer. 63. t. 182. f. 20. (Coutarea speciosa; Aubl. Guian. v. 1. 314. t. 122.)—Flowers terminal, six-cleft, with six stamens; tube curved. Calyx awl-shaped. Leaves ovate.—Native

of Guiana. Introduced at Kew in 1803, but it has not yet flowered. The *leaves* are shaped like the last, but more pointed and less coriaceous. *Flowers* numerous, red, very handsome, terminal, and somewhat corymbose; their *corolla* about two inches long, inflated, in six divisions. Leaves of the *calyx* awl-shaped, very narrow, except at the base. In its native country this fine shrub blossoms in February and June.

PORTLANDIA, in *Gardening*, contains plants of the trailing, evergreen, exotic kind for the stove, of which the species cultivated is the great-flowered portlandia (*P. grandiflora*).

Method of Culture.—These plants may be raised either from seeds or cuttings.

The seeds, when procured, should be sown in pots, filled with light earth, in the spring, plunging them in the tan-bed, in the stove. When the plants are sufficiently strong, they should be removed into separate pots, and be replunged in the bark hot-bed, where they must be constantly kept.

The cuttings of the young shoots should be planted out singly, in pots filled with the same sort of mould, plunging them in the bark bed of the stove: when they have taken good root, they should be removed into larger pots, replunging them into the tan-bed, where they must remain.

They afford a fine effect, when trained on the back part of the stove in their larger flowers.

PORT-LAST, in a *Ship*, denotes the gunwale.

When a yard is down on the deck, they say, the *yard is down a port-last*.

PORTLAW, in *Geography*, a post-town of the county of Waterford, Ireland, between Waterford and Carrick, and 89 miles S.W. from Dublin.

PORT-LIDS, in *Ship Building*, the shutters hung with hinges at their upper edges, which inclose the ports in rough weather.

PORTLOCK, in *Geography*. See PORLOCK.

PORTLOCK'S Harbour, an inlet on the W. side of King George Third's Archipelago. N. lat. 57° 44'. E. long. 224°.

PORTLOGO, a town of Africa, in the country of Sierra Leone, on the N. branch of the Sierra Leone river. N. lat. 8° 40'. W. long. 12° 36'.

PORTMAHALLOCH HARBOUR, a bay on the S. side of the Frith of Dornoch. N. lat. 57° 48'. W. long. 3° 47'.

PORTMANNIMOTE, in *Old Records*, the port-men's court, held in any city or town.

PORT-MANTEAU, a piece of joiner's work, fastened to the wall, in a wardrobe, armoury, &c. proper for the hanging on of cloaks, hats, &c.

PORT-MANTEAU is also used for a cloak-bag of cloth, leather, or the like, in which the cloak and other habiliments of travellers are disposed, and laid on the horse's crupper.

PORT-MANTEAU was also an officer under the late king of France, of whom there were twelve: their business was to keep the king's hat, gloves, cane, sword, &c., to take them from him, and to bring them to him again when wanted.

The dauphin had also his port-manteau. Answerable to these were the cardinals caudataries, or tail-bearers.

The Romish bishops have also their port-croix, port-mitres, &c. *i. e.* crozier-bearers, mitre-bearers, &c.

PORT-MEN, the twelve burgeses of Ipswich; thus called in the stat. 13 Eliz.

Camden adds, that the name was common to the inhabitants of all the cinque-ports.

PORTMOTE, formed from the Saxon *port*, port, and *gemot*, *conventus*, meeting, *q. d. portgemot*, signifies a court kept in port or haven towns; as Iwanimote in the forest. It is sometimes also called the *portmote court*.

Portmotes are also held in some inland towns, as at Knolst in Cheshire.

PORT-NAILS, in a *Ship*, such as are used to fasten the hinges to the ports.

PORTNEUF, in *Geography*, a town of Canada, on the river St. Laurence; 20 miles S.W. of Quebec.—Also, a river of Canada, which runs into the St. Laurence, N. lat. $48^{\circ} 45'$. W. long. $68^{\circ} 50'$.

PORTO, a town of Sicily, in the valley of Mazara; two miles E. of Palermo.

PORTO. See OPORTO.

PORTO, a town of Spain, in the province of Leon; 43 miles S.W. of Astorga.—Also, a small sea-port town of the Patrimonio, situated on the W. side of the Tiber, the remains of a town built by Claudius and Trajan. It is the see of a bishop, who is generally a cardinal, and dependent only on the pope; 10 miles S.W. of Rome.—Also, a town of Italy; 19 miles N.W. of Como.—Also, a sea-port town of the island of St. Mary, one of the Azores.

PORTO Bello, or *St. Philippe de Puerto Bello*, a sea-port town of America, on the N. coast of the isthmus of Darien, consisting of about 130 houses, mostly built of wood, or of wood intermixed with stone, and situated nearly opposite to Panama on the southern side of the isthmus, very near the sea, on the declivity of a mountain, which surrounds the whole harbour. The town consists of one principal street, extending along the strand, and recrossed by several others passing from the declivity of the mountain to the shore, with some lanes parallel to the principal street. It has two squares, a custom-house, and a stone church, which is served by priests that are natives of the country, and two convents. At the east end of the town, on the road to Panama, is a quarter, called "Guinea," inhabited by negroes of all sexes, whether slaves or free. This quarter used to be much crowded, when the galleons were at Porto Bello, at which time the town, generally but thinly inhabited, becomes one of the most populous places in the world. Its situation on the isthmus, between the South and North seas, the goodness of its harbour, and its small distance from Panama, gives it a preference to all other places, for the rendezvous of the joint commerce of Spain and Peru, at the time of its fair. When advice was received at Carthagena, that the Peru fleet had unloaded at Panama, the galleons hastened to Porto Bello, in order to avoid the distempers, springing from idleness, which afflicted the seamen. The concourse of people on this occasion was so great, that houses and every kind of accommodation were extravagantly dear. As soon as the ships were moored in the harbour, the seamen erected in the square a large tent with sails, where they deposited all the cargo, that each owner might distinguish his goods by their respective marks. The bales of goods were drawn on sledges by the seamen, and the money paid for their labour was equally divided. At the same time, while the seamen and European traders were thus employed, the land was covered with droves of cattle from Panama; each drove consisting of above 100, loaded with chests of gold and silver, on account of the merchants of Peru. When the ships were unloaded, and the merchants of Peru, with the president of Panama, arrived, the formalities of the fair commenced: the deputies of the several

parties repaired on board the ships, where, in the presence of the commander of the galleons and of the president of Panama, the former as patron of the Europeans, and the latter of the Peruvians, the prices of the several kinds of merchandise were settled, and the contracts signed and publicly announced, so that every one might by them regulate the sale of his effects; and thus all fraud be precluded. The purchases and sales, as well as the exchange of money, were transacted by brokers from Spain and Peru. After this every merchant began to dispose of his own goods; the Spanish brokers embarked their chests of money; and those of Peru sent away their purchased goods in vessels up the river Chagre, and thus the fair of Porto Bello ended. But since the mode of commerce by galleons has been abandoned, Porto Bello has also declined, and the dereliction of this mode of commerce has also greatly impoverished all the cities and towns between Carthagena and Lima.

This was discovered Nov. 2, 1502, by Columbus, who was so charmed with its extent, depth, and security, that he called it "Porto Bello," or "The Fair Harbour." Its mouth, though three quarters of a mile broad, is well defended by fort St. Philippe de Lodo Hiarro, or Iron Castle, situated on the N. point of the entrance; for the S. side being full of water, ships are obliged to keep in the middle, and consequently within 660 yards of the castle, in from nine to fifteen fathoms of water, with a bottom of clayey mud, mixed with chalk and sand. On the S. side of the harbour, and about 200 yards from the town, is a large castle, called "St. Jago de la Gloria," having before it a small point of land, projecting into the harbour, and upon it a small fort, called "St. Jerom," within 20 yards of the houses. All these were demolished by admiral Vernon in 1739, with six ships only.

The inclemency of the climate of Porto Bello is notorious. The excessive heat is augmented by the situation of the town, which is surrounded by high mountains, that obstruct every current of wind, by which it might otherwise be refreshed. The trees on the mountains are so thickly set, that they intercept the rays of the sun, and thus the earth under their branches is prevented from becoming dry, and some copious exhalations form large heavy clouds, which burst down in violent torrents of rain; and then the sun breaks out again with its former splendour; and by this kind of alternate succession of rain and heat, no interval of refreshing coolness occurs. These torrents of rain are often accompanied with tempests of thunder and lightning, which being reflected and reverberated from the mountains, and their caverns, and rendered still more terrible by the hideous howlings of monkeys of all kinds, that in immense numbers inhabit the forests, are sufficient to appal the most intrepid. The fatigue which the seamen undergo in their labour, added to the heat of the climate, occasions a very profuse perspiration, which debilitates and dispirits them; so that they have recourse to brandy, of which a great quantity is consumed, for relief. All these circumstances concur to injure the best constitutions, and to produce those deleterious diseases that are common in this country. The diseases of the seamen attack other inhabitants that do not engage in their exhausting employment; so that the causes of their diseases must be attributed, not merely to labour and fatigue, and excess of drinking, but to the insalubrity of the climate; 60 miles N. of Panama. Porto Bello is less sickly since a passage was cut through a hill to admit a current of air. N. lat. $9^{\circ} 42'$. W. long. $79^{\circ} 45'$.

PORTO Bello, a small island in the East Indian sea. S. lat. $0^{\circ} 57'$. E. long. $107^{\circ} 58'$.

PORTO Balabatatella, a harbour on the S. coast of Sicily. N. lat. $37^{\circ} 8'$. E. long. $13^{\circ} 53'$.

PORTO Bufalo, a sea-port on the S.W. coast of the island of Negropont. N. lat. $38^{\circ} 13'$. E. long. $24^{\circ} 15'$.

PORTO Caballo, Cabello, or Cavello, a sea-port town of South America, in the government of Caraccas, with an excellent harbour, and about 7500 inhabitants; 25 miles N.E. of Caraccas. Porto Cabello was raised into importance, on account of the excellence of its harbour, by the company of Guipuscoa, who established there one of its principal factories. They also constructed a superb pier, 92 feet long and 12 wide, for the accommodation of their vessels, and some forts for their defence. The city, properly so called, is situated so near the sea, that it occupies many spots very lately under water, and which have been raised by encroachments above the level of the ocean. The original town is surrounded by the sea, if we except about 100 toises on the W., where is contrived a canal, that affords a communication between the southern and northern part of the sea, and consequently makes the city an island, from which there is no exit, but over a bridge, at the end of which is placed the main guard, and a gate that is shut every evening. The general occupation of the white inhabitants consists of commerce and navigation. Their principal and almost only connections are with the ports of the same continent and the neighbouring colonies. Four or five ships carry every thing that arrives annually from Spain, and whatever is sent thither; whilst more than 60 vessels are employed in the coasting trade. Porto Cavello is the deposit of all the eastern part of the province of Venezuela; its commerce is carried on by twenty Europeans. This port is the place of resort for the vessels of the neighbouring ports, for refitting, calking, and even building. It wants only a greater degree of salubrity to be the first port in America. Its water is conducted into the city from a river that falls into the sea at a quarter of a league to the west by canals, and distributed to the public in cisterns placed at convenient distances. As a fortified place, it is chiefly under the orders of a military commander, who exercises almost every kind of authority. It has only one parish church, which is situated near the harbour; it has two hospitals, one for the troops and one for private persons. Porto Cavello is 30 leagues from Caraccas by the way of Guayra, and 48 by Valencia, Maracay, Tuemero, Victoria, and San Pedro. S. lat. $10^{\circ} 20'$. W. long. $70^{\circ} 31'$ from Paris.

PORTO Cairo, or Porto Gabriel, a harbour on the W. coast of the island of Metelin. N. lat. $39^{\circ} 17'$.—**P. Canfado**, a harbour on the W. coast of Africa. N. lat. $28^{\circ} 4'$. W. long. $11^{\circ} 50'$.—**P. Casideb**, a harbour on the coast of Natolia, in the gulf of Stanchio. N. lat. $37^{\circ} 7'$. E. long. $27^{\circ} 44'$.—**P. Cavaleiri**, a port on the S. coast of Natolia, opposite to the island of Rhodes. N. lat. $36^{\circ} 40'$. E. long. $27^{\circ} 44'$.—**P. de Castellanos**, a sea-port on the island of St. Sebastian. —**P. de Comboa**, a town of Portugal, in Estramadura, on the W. coast; 2 miles N.E. of Peniche.—**P. Condea**, a harbour on the S. coast of the island of Stalimene. N. lat. $32^{\circ} 50'$. E. long. $25^{\circ} 16'$.—**P. Digoro**, a small place of Italy, at the mouth of the Po.—**P. Farina**, a sea-port of Africa, in the kingdom of Tunis, called by the ancients "Rufcicon," and by the natives "Gar el Mailah," or the Cave of Salt. The harbour is safe in all weathers, and opens into a navigable lake or large pond, formed by the river Mejerdah, which runs through it into the sea. N. lat. $36^{\circ} 30'$. E. long. $10^{\circ} 16'$.—**P. Fermo, or Fermano**, a port of the marquise of Ancona, on the Adriatic; 3 miles N. of Fermo. — **P. Ferrajo**, a sea-port on the N. coast of

the island of Elba. N. lat. $42^{\circ} 53'$. E. long. $10^{\circ} 28'$.—**P. Fino**, a sea-port of Genoa, situated between two mountains; anciently called "Portus Delphini;" 12 miles E. of Genoa. N. lat. $44^{\circ} 19'$. E. long. $9^{\circ} 8'$.—**P. Gaurio**, a sea-port on the S.E. coast of the island of Andros. N. lat. $37^{\circ} 51'$. E. long. $24^{\circ} 45'$.—**P. Genovesa**, a harbour on the coast of Natolia, in the gulf of Satalia; 30 miles S. of Satalia.—**P. Grato**, a sea-port on the S. coast of the island of Scarpanto. N. lat. $35^{\circ} 31'$. E. long. $26^{\circ} 45'$.—**P. Greco**, a town of Naples, in Capitanata, on the sea-coast; 9 miles S. of Vieste.—**P. Gruaro**, a town of Italy, in Friuli, on the Lamene, containing three churches and four convents; 2 miles N. of Concordia. N. lat. $45^{\circ} 48'$. E. long. $12^{\circ} 51'$.—**P. Hercule**, a sea-port in the Stato de gli Præfidii, situated on a peninsula; 4 miles S. of Orbitello. N. lat. $42^{\circ} 25'$. E. long. $11^{\circ} 8'$.—**P. Jero**, a bay on the S.E. coast of the island of Metelin.

PORTO Legnano, a town of Italy, in the Veronese, on the N. side of the Adige, opposite to Legnano.—**P. Leoni, or Lione, or Pireo**, a sea-port of Athens, in European Turkey, and province of Livadia. N. lat. $37^{\circ} 56'$. E. long. $23^{\circ} 40'$.—**P. Livadi**, a sea-port on the E. coast of Livadia. N. lat. $37^{\circ} 55'$. E. long. 24° .—**P. Longone**, a strong sea-port on the S.E. coast of the island of Elba, seated on a promontory, in a large bay, defended by a castle on a projecting rock; 2 miles S.E. of P. Ferrajo. N. lat. $42^{\circ} 52'$. E. long. $10^{\circ} 32'$.—**P. Madera**, a port on the E. coast of St. Jago, one of the Cape Verd islands. It is a good harbour, and though the entrance is narrow, it is neither difficult nor dangerous.—**P. Maggiore**, a town of Italy, in the department of the Lower Po, on the coast of the Adriatic; 3 miles S.E. of Comacchio.—**P. Mandri**, a harbour on the E. coast of Livadia. N. lat. $37^{\circ} 43'$. E. long. $24^{\circ} 2'$.—**P. Marmora**, a harbour on the E. coast of the island of Paros. N. lat. $37^{\circ} 3'$. E. long. $25^{\circ} 17'$.—**P. Mastico**, a sea-port on the W. coast of the island of Scio. N. lat. $38^{\circ} 15'$. E. long. $25^{\circ} 57'$.—**P. Maurizio, or Morizzo**, a sea-port of Genoa, on a small gulf, which separates it from Oneglia; 8 miles W. of Oneglia. N. lat. $43^{\circ} 55'$. E. long. $8^{\circ} 3'$.—**P. Mefta**, a harbour on the W. coast of the island of Scio. N. lat. $38^{\circ} 20'$. E. long. 26° .—**P. Morone**, a town of Italy, in the department of the Tesino; 12 miles E. of Pavia.—**P. de Moz**, a town of Portugal, in the province of Estramadura; 10 miles S. of Leyria.—**P. de Mugon**, a town of Portugal, in the province of Estramadura, on the Tagus; 7 miles below Santaren.—**P. de Naos**, a harbour on the S. coast of Lancerotta, and one of the principal ports of that island. The access to the harbour is unsafe, on account of the rocks that form it, which lie under the water; but as they break the swell of the water, the inside is as smooth as a mill-pond. As there is no other convenient place among the Canary islands for repairing large vessels, this is much used for that purpose.—**P. Novo**, a town of Hindoostan, in the Carnatic, where the Dutch have a resident. Upon its capture by Aurungzebe, he called it "Mahomet Bender;" a name now given to it by the natives.—**P. Novo**, a town of Africa, in Benin, possessed by the Portuguese. N. lat. $6^{\circ} 24'$. E. long. $1^{\circ} 45'$.—**P. Novo**, a town of Portugal, in Estramadura; 23 miles N.W. of Lisbon.—**P. Paglia**, a harbour on the W. coast of Sardinia. N. lat. $39^{\circ} 23'$. E. long. $8^{\circ} 31'$.—**P. Paradiso**, a harbour on the E. coast of the island of Rhodes. N. lat. $36^{\circ} 25'$. E. long. $27^{\circ} 45'$.—**P. Pavone**, a harbour on the S. coast of the island of Nisida, in the gulf of Naples.—**P. Petera**, a harbour on the N. coast of the island of Metelin. N. lat. $39^{\circ} 27'$. E. long. $26^{\circ} 10'$.—**P. Petriais**, a harbour on the N.E. coast of Negropont. N. lat. $38^{\circ} 24'$. E. long.

E. long. 24'.—*P. Phanari*, a port on the coast of Livadia, belonging to Athens. N. lat. 37° 56'. *E. long.* 23° 42'.—*P. Phylco*, a bay on the S. coast of Natolia. N. lat. 36° 48'. *E. long.* 26° 54'.—*P. Pin*, a harbour on the S. coast of Asiatic Turkey, in the Mediterranean. N. lat. 36° 36'. *E. long.* 33° 54'.—*P. Portesi*, a harbour on the N. coast of Sardinia. N. lat. 41° 8'. *E. long.* 9° 20'.

PORTO Praya, a town of St. Jago, one of the Cape Verde islands, situated at the foot of an elevated plain, on the E. side of the island. This town, or rather hamlet, is the residence of the governor-general, for the crown of Portugal, of the Cape de Verde on the main land of Africa, and of the Cape de Verde islands opposite to it. His abode is a little wooden barrack, pleasantly situated at one extremity of the plain, looking down a valley over a grove of cocoa-nut trees, and having a view of the bay and shipping. The governor's garden is about two miles inland, distant from his habitation. Here a small clear rivulet issues from a source at the bottom of some rocks, and wherever it is made to run, every species of vegetable near it flourishes. This rivulet supplies many of the principal inhabitants of Praya, who have that distance to get good water. The cattle near it are relieved from thirst, and the fields adjoining it appear like a bleach-ground, from the quantity of linen washed in the little streams, and dried close to it. The whole hamlet consists of about 100 very small dwellings, one story high, scattered on each side of the plain, which extends near a mile in length, and about the third of a mile in breadth, and falls off, all around, to the neighbouring vallies, and to the sea. Not being commanded by any neighbouring eminence, it is a situation capable of defence: the fort, however, or battery, is almost in ruins; and the few guns mounted on it are mostly honey-combed, and placed on carriages which barely hold together. The militia is said to consist of three regiments, of about 700 men, chiefly officered by Mulattoes and Negroes; and not above ten white officers in the whole, one of whom is an inn-keeper. The best building is the gaol, and the next the church, at which officiates a priest, who is a dark-coloured Mulatto. Such is the account given of Praya by sir G. Staunton. The bottom of the bay, in seven fathoms water, is better than at a depth of 12 or 14 fathoms, beyond which it is uncertain and rough. The bay is open to the wind from S.E. to W. by S.; but it is never supposed to blow here so hard, or to bring in so much sea, as to endanger a ship's continuing to ride at her anchors steadily. The latitude of the bay is 14° 56' N., and its longitude 23° 29' W. The variation of the compass is 12° 48' W. The tides, in the full and change of the moon, rise nearly five feet perpendicular. English men of war salute with eleven guns, on an assurance of a return of an equal number. This bay has for several years been frequented by ships bound to the southward, as bullocks, sheep, hogs, goats, poultry, and fruits, were abundant and reasonable. Fish may be likewise taken by the seine. An excellent kind of rock-cod may be caught from the rocks with rod and line. Port Praya has long been a place where the outward-bound Guinea and Indiamen have been accustomed to touch at for water and refreshments, but few of them call here on their return to Europe. The inhabitants barter their provisions and fruits for shirts, drawers, handkerchiefs, breeches, hats, waistcoats, and all kinds of clothing.—*P. Primero*, a small harbour at the mouth of the Po.—*P. del Principe*. See *VILLA del Principe*.

PORTO Rico, an island in the West Indies, belonging to Spain, about 120 miles in length, and 40 in breadth. The climate is temperate, and the soil is rich and fertile. It is

beautifully diversified by hills, woods, and vallies, and well watered by streams that flow from the mountains. The northern part, which is the most barren, is said to contain mines of gold and silver. Its chief products are fugar, ginger, cotton, flax, coffee, cassia, incense and hides. Of the latter more than 2000 are sent every year to Europe. The cattle, which are abundant, were originally imported from Old Spain. Its mules, which are not numerous, are much esteemed in Jamaica. The woods abound with parrots, wild pigeons, and other fowl. European poultry is plentiful, and the coasts afford an ample supply of fish. The inhabitants are well supplied with fruits of various kinds, both for consumption and exportation, and good salt. The dogs of this island, furnished by a breed brought over to America, by the Spaniards, for the purpose of hunting and tearing in pieces the defenceless inhabitants, roam in the woods near the sea-shore, in a wild state, and subsist on land crabs, that burrow in the earth. Porto Rico was discovered by Columbus in 1493, and was subjugated by Ponce de Leon, the first explorer of Florida, about the year 1509. In 1597 this island was taken by the duke of Cumberland; and in 1797 the capture of it was unsuccessfully attempted by the English. This island, though beautiful, fertile, and productive, is very subject to hurricanes, and a terrible one, in 1742, destroyed its fertility for many years. The number of its inhabitants is estimated at about 10,000 persons. The chief town is Porto Rico, situated on a little isle, and founded in 1510; it was formerly a chosen abode of smugglers. On the S.W. of the town is a fort called St. Antonio. The Spanish inhabitants of the town are supposed to be about 500. See *St. JUAN de Porto Rico*. N. lat. 18° to 18° 35'. W. long. 65° 30' to 67° 45'.

PORTO Santo, a small island of the Atlantic, N.E. of Madeira, and probably discovered by the Portuguese about the same time with the latter. It derived its name from the protection which it afforded to its discoverers during a storm. It was then uninhabited; but was peopled by the Portuguese, and continued ever since in their possession. It has a good harbour, with one bay, in which ships may ride securely from all winds, except the S.W. It is occasionally visited by East India ships, which afford the island all the trade they enjoy. Although small, not exceeding 15 miles in compass, it is fertile, producing wheat and corn in abundance; also cows, wild boars, and rabbits, the latter in great numbers. But its most valuable productions for export, are dragon's blood, honey, wax, and silk. N. lat. 33° 0'. W. long. 16° 50'.

PORTO Santo, a sea-port of South America, in the government of Caraccas.

PORTO St. Antonio, a harbour on the S. coast of Stalimene; six miles E. of Condea.

PORTO de St. Pedro, a sea-port town of Brazil, near the mouth of the river Iguay. S. lat. 31° 55'. W. long. 52° 6'.

PORTO Seguro, a province of Brazil, which was the first land discovered by the Portuguese in 1500, and the name of the haven was given to it by Cabral. It was erected into a marquisate, in favour of Don Alonzo de Lancaster, by Philip II., king of Spain and Portugal, and remained in that family until the year 1758, when it reverted to the crown. Its mountains are said to contain precious stones of various kinds; but after the subjection of Portugal to Spain, the discoveries to this purpose that had been made were lost; and the passages to the mines are now held by ferocious tribes, so that the mountains have not been explored. Near the church of Aguda, in this province, is a fountain said to have sprung up miraculously, as the pious Portuguese believe,

lieve, when water was wanted for mortar to complete the work. The capital of the same name contains four churches with a fortified castle, the residence of the governor; and it has a convenient and safe harbour, with good anchorage, in a bay at the mouth of a river of the same appellation. S. lat. $16^{\circ} 45'$. W. long. $40^{\circ} 46'$.

PORTO *Sigri*, a sea-port town on the N. coast of the island of Metelin, near cape Sigri.

PORTO *Symbolo*, a harbour on the coast of Natolia, in the gulf of Macri; 18 miles S.S.W. of Macri.

PORTO *Tigani*, a port on the S. coast of the island of Samos. N. lat. $37^{\circ} 44'$. E. long. $26^{\circ} 54'$.

PORTO *Vecchio*, a sea-port town of the island of Córfrica, (department of Liamone and district of Sartenc,) situated on a gulf on the E. coast, which forms a spacious harbour, in the midst of marshes, which render it insalubrious; 60 miles S. of Bastia. The canton contains 2515 inhabitants. N. lat. $41^{\circ} 25'$. E. long. $9^{\circ} 27'$.

PORTO *di Venero*, a sea-port town of Genoa, at the entrance of the gulf of Spezza; five miles S. of Spezza. N. lat. $44^{\circ} 5'$. E. long. $9^{\circ} 38'$.

PORTO *Vico*, a town of Italy, in the department of the Mela; 18 miles S.S.W. of Brescia.

PORTO *Vourcaria*, a harbour on the S. coast of the island of Samos. N. lat. $37^{\circ} 47'$. E. long. $27^{\circ} 1'$.

PORTODAL, or *Porto d'Ally*, a sea-port of Africa, in the kingdom of Baol, on the coast of the Atlantic; trading chiefly in hides, teeth, gold, and ambergris. N. lat. $14^{\circ} 36'$. W. long. $16^{\circ} 56'$.

PORTOIN, a town of Sweden, in the province of Wafa; 20 miles S. of Wafa.

PORTOISE, aboard a *Ship*, is the same with *port-last*, or the *gun-wale*; and as they say, *the yard is down a port-last*, when it lies down on the deck; so for a ship to ride a *portoise*, is to ride with her yard a *port-last*, or struck down to the deck.

PORTOLA, in *Geography*, a town of Istria; 10 miles S. of Capo d'Istria.

PORTOPENA, in *Ancient Geography*, a town of Asia, in the interior of the Perside, marked by Ptolemy between Axima and Persepolis.

PORTORARIUM, in *Anatomy*, a name given by some authors to the duodenum.

PORTORIUM, in *Antiquity*, a name given among the Romans to the duties laid upon merchandize brought through the gates of cities, and into sea-ports, or taken out of them.

PORTOSPANA, in *Ancient Geography*, a town of Asia, in the interior of Caramania.

PORTOZERO, in *Geography*, a town of Russia, in the government of Olonetz, on the river Andoma, near the Oneskoe lake; 20 miles S. of Pudoga.

PORTPATRICK, a sea-port town in the district of the Rhyns, shire of Wigtown, and ancient principality of Galloway, Scotland, is situated on the eastern coast of the Irish sea, at the distance of 132 miles S.W. by S. from Edinburgh. It is the nearest point of land in the island of Great Britain to Ireland, and is considered the best place for crossing from one kingdom to the other, the distance being only 21 miles. The etymology of its name evidently points it out as the port whence the celebrated St. Patrick sailed on his first holy mission to the country which afterwards adopted him as its patron saint; but other ports, both of Scotland and England, likewise claim this distinction. In several old charters it is called port Montgomery, from a family of that name, who possessed extensive property in the vicinity, and strove, in vain, to change its original designation. Portpatrick has the advantage of a fine southern

aspect; and being defended from the northern winds by a semicircle of small hills, enjoys a warmer climate than most places in the same latitude. It is an excellent sea-bathing place, and is much frequented during the summer months. Formerly the harbour here was a mere inlet, between two ridges of rocks which advanced into the sea; but now there is a very fine quay, which is accommodated with a reflecting light-house upon it; and four packet boats regularly sail between this town and Donaghadee, on the Irish coast, with the mail and passengers. Mail coaches are also established from Edinburgh and London to Portpatrick, and from Dublin to Donaghadee. The principal support of this place arises from the importation of black cattle and horses, and from the great concourse of travellers constantly passing here. Almost every house is an inn, where strangers may find accommodation adapted to their circumstances. A fishery was some time ago attempted here; but the velocity of the tide frequently carrying away the nets, operated so much to the discouragement of the fishermen, that it is now entirely abandoned as a branch of trade. A body of men, about twenty in number, act at the harbour as porters, and are distinguished by the name of the *robbery*, from their supposed depredations on the public; but though their impositions deserve reprehension, they are perhaps necessary evils at this port. It is remarkable that the sea ebbs and flows here nearly an hour later than at the opposite port of Donaghadee; and that a similar variation happens with respect to particular parts of the coast on the Scottish side. Within four miles of the Irish shore, when the flood returns, there is a regular current sets off rapidly for the mull of Galloway; it runs at the rate of seven knots an hour, and is so forcible, that when the wind opposes it, it exhibits for a great way the appearance of breakers. This circumstance rendered the harbour of Portpatrick formerly somewhat unsafe, especially when the wind blew strong from the west or north, but the inconvenience is completely remedied since the improvements brought about by the exertions of the late sir David Hunter Blair.

The parish of Portpatrick is about four miles and a half square, and contains, according to the parliamentary returns of 1811, 247 houses, and 1302 inhabitants. The surface is uneven and hilly, and consists of a great proportion of moor-land. The only remain of antiquity within its boundaries is Dunskey castle, which stands about half a mile from the town of Portpatrick, on the edge of a tremendous precipice, or rocky cliff, projecting into the Irish sea. At what period the present structure was erected, is uncertain; but we learn from history, that the spot on which it stands was fortified with a castle as early as the year 685, when Eugene V. began his reign. This fortress was defended on the land side by a deep ditch, now nearly filled up, over which a drawbridge was thrown. The buildings occupy the whole breadth of the cliff in front, but there is an area or parade behind about twenty yards broad. Adjoining to Dunskey is a cave, which has long been held in superstitious veneration by the people. At the change of the moon it is usual to bring, even from a great distance, infirm persons, and particularly ricketty children, whom their parents often suppose bewitched, to bathe in the stream which pours from the hill, and then dry them in the cave. Beauties of Scotland by Rob. Forsyth, vol. ii. Carlisle's Topographical Dictionary of Scotland.

PORT-RAFT. See RAFT.

PORTRAIT, from the French verb *peindre*, to draw or paint; a representation of any specific object in nature, as a man, a horse, a tree, &c. &c. Although this word is equally applicable to all pictures imitative of peculiar objects,

objects, yet, when used simply and alone, it is generally considered as allusive to those of the human face or figure. When any other productions of nature are represented, we commonly add its name in description; as a portrait of a horse, of a dog, of a tree, &c., and this distinction arises solely from the painter being called upon more frequently to exercise his art in imitation of his fellow mortals, than upon any other subject.

PORTRAITURE, the art of painting portraits. This peculiar application of the art of painting constitutes one of the four grand divisions of its exercise; the others being history, landscape, and still life.

As we have above observed, portraiture is principally considered as applied to the human form; and as the principles upon which the just imitation of all other natural productions ought to be conducted, are necessarily included in that of the most beautiful and variable among them, we shall confine our remarks to that peculiar application of it.

In contradistinction to the grander elements of historical art, which demand only a representation of generic form, and of actions and expressions descriptive of the various classes of mankind, to the exclusion of individual varieties, merely as such; those of portrait painting, moving in an opposite course, have the meaner varieties for their basis; and we can only attempt to add dignity and beauty, so far as will still leave a just and distinguishing character of imitation, in a perfect and full resemblance of the peculiarities of the individual selected.

Portrait painting, when justly considered and executed, is not, as may be imagined, a tame business of imitation, a mere laborious exactness in copying the precise form which is placed before the artist. Mere likeness is a matter produced, as we see every day, by the dullest of the dull; or by men who will copy to deception the turn of a hair, or the folds of drapery. But while such artists make the features of exact form, they leave them void of animation, of just colour, or of any degree of sense or sentiment; and instead of exhibiting taste or grace in the drapery, present us with a correct list of folds, duly connected indeed, but very fortunately arranged in the models, if they convey any just idea of the form beneath; or more particularly if they display it with propriety or beauty.

Imitation is, however, the true and only sound foundation of painting; but in the higher branches of the art, it must be accompanied by selection, and conducted upon a system subjected to the demands of character, of expression, and locality. In portraiture it will be found that the same principle of selection must be exerted, when works, really excellent, are hoped for; though a more precise degree of it be required, maintained within narrower bounds, and more exactly balanced.

It is a very mistaken notion, therefore, although exceedingly prevalent in the world, and apparently just, that likeness depends upon the representation of every minute undulation of line in the features, or variety of colour, even of those which are considered as defects; such as spots, moles, wrinkles, &c. &c.; and the portrait painter has not a greater torment to endure, than the perplexities in which he is constantly involved by the weak interference of friendly visitors, who desire to be indulged with seeing such absurd and useless things attended to; so diametrically is that trifling at variance with his own knowledge, that they rather tend to weaken, than increase, the general and interesting points of resemblance. Yet disinclination to bend his judgment to this caprice, is considered as arising from conceit or obstinacy, and an unwillingness to oblige; and the very circumstance which he feels, and which ought to obtain for him most

estimation, loads him with unfavourable opinion, and retards his success; even obstructs the free exercise of his imagination, and prevents the indulgence of those feelings, which, unrestrained, might, in the end, afford more gratification to his employers, than the most minute attention to their untutored wishes possibly can.

The great delight afforded by sir Joshua Reynolds' portraits, rests upon this enlarged principle of imitation; yet who will say they lack identity? or that they do not exhibit it more fully, than was ever done by the works of any other artist? Witness his pictures of the duke of Orleans, lord Rodney, lord Ashburton, bishop Newton, and numbers of others which the world has lately seen exhibited. He, fortunately, both by talents and exterior circumstances, was enabled to act upon his own exalted principles; and not content with the practice alone, has, in his eleventh discourse, told us, that "the excellence of portrait painting, and we may add even the likeness, the character, and countenance, depend more upon the general effect produced by the painter, than on the exact expression of the peculiarities, or minute discrimination of the parts."

Likeness is, however, the object and end of portrait painting; and the question, therefore, arises,—What are the main points to which the artist's attention must be directed to ensure success? We answer,—Proportion, air, or action, colour, and expression. The first of these, necessarily including form, is of the utmost importance, and, when considered in all its bearings, a "fine qua non" in the practice of this branch of the art; with which alone, should the other qualities lack somewhat of their utmost perfection, the work may be redeemed, by retaining somewhat of character at least; as we frequently see exemplified in caricatures, where no precise correctness of form or colour is maintained. It is by this quality principally that we recognise our friends at a distance, before a feature is distinctly visible, and while they are at rest; but aided when they are in motion, by their peculiar modes of action. This is the principal medium by which corporeal resemblance is attained; and then follow the mental agents, air and expression.

The mode in which a man turns his head, or disposes of his limbs, either in action or at rest, is not unfrequently quite peculiar to himself; and when it is not of a nature too far diverging from what is agreeable, it is certainly desirable that it be retained in a portrait. Even extravagant peculiarities may frequently be so modified by the hand of taste, as to become picturesque, and even agreeable. All depends upon the selection of the moment, the direction of view, and the chiaro-scuro. At any rate, all set actions, not founded upon the character, either mental or personal, of the subject, ought to be avoided.

The selection of actions characteristically appropriate to his sitters, forms a grand feature in the practice of our great artist above-mentioned; and perhaps if there be one thing more than any other which elevates him above all other portrait painters, it is this very peculiar circumstance, by which we are more immediately informed of mental character, than by physiognomical traits alone. In Vandyke's pictures generally, and in many of Titian's, the actions of the figures seem to have been the offspring of study, rather than of nature; to have been composed, not selected; formed rather to shew the figures than the characters of the subjects; and were probably arranged without them. In those of sir Joshua Reynolds, on the contrary, in most cases where there was any character to display, the actions appear so congenial to the known characters of the subjects, that we conceive them to have been their own; seized in happy moment, and rendered permanent by his clear perception,

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and consummate judgment. We would strongly recommend this practice to all artists; but it must of course be subject to some judicious controul. A hint of the general line of an action may be taken, its character being improved in composition, by slight variations, and by well-managed illumination; and in pursuing this system, one very great advantage is acquired, which is, that the action being natural to the man, an unconstrained expression of features will be found to accompany it; and thus his natural character will be most easily and most effectively displayed.

It is not always, perhaps not often, that a portrait painter enjoys the opportunity of knowing enough of his subject, or sees enough of him, to avail himself decidedly of his natural propensities. In many cases, on the very first introduction, a sitting takes place; and then the only means of studying the character is by making unnoticed observations on the general manner of carriage, or of expression, by prolonging discourse before the sitting, by making occasional interruptions, and by throwing objects of attention in the way, which may in some measure elicit an unconfined freedom of action. But it is only by doing this unobtrusively, that actual character can be discovered. The instant a person is aware that he is noticed, farewell to nature: restraint immediately usurps dominion, and baffles the most quick and intuitive perception. It will happen, however, very frequently in this portrait painting age and country, that those who, by the calls of affection or of vanity, become subjects for the painter, have no decided stamp of character, which sufficiently distinguishes them from their fellow-mortals; and in these cases, the painter is entirely at liberty to choose his own action, and indulge his fancy, according to the sex, the age, and quality of his employer. His object, of course, will be to make it as agreeable as possible; to place it in the light most favourable to beauty, or force; and to make amends, as well as he can, for the deficiencies of his model, by a skilful application of the general principles of his art.

It is scarcely necessary to say, that different ages require different actions. It must be felt by all, that the aged should be represented calm, serious, and dignified; and may be so placed as to receive great strength of illumination, with beneficial effect: whilst the young should be animated and graceful; and they will produce more agreeable models for the pencil, if illuminated with a weakened tone of light, which softens the harsher projections of feature, and adds gentleness to beauty.

In conjunction with the character of mind, conveyed by the action of a portrait, should be the expression of the features, singly and combined; and herein lies the greatest difficulty the artist has to contend with: consequently he is the most worthy of praise as a painter of portraits, who succeeds in this arduous task, the stumbling-block of thousands; for which no efficient rules can be given, since it is the offspring of feeling alone. From the want of this feeling arises the dissonance, and even distortion, so often visible in portraits, where the features individually are correctly drawn, and exquisitely coloured. In some we see displayed a mouth contracted by melancholy, united to eyes sparkling with enjoyment; or a brow elevated by sentiment, with cheeks and lips inanimate and dull. In others, a head or hand raised or advanced with energy, while the features are lifeless; or the nostrils dilated as with passion, but the eyes uninfluenced, and the mouth closed or opened by stupidity itself. These are errors which arise from an artist copying what he sees at various times, without reference to the whole; without being guided by a spirit of unity; and attempting to give animation, without judgment: errors

which unfortunately cannot be remedied, or prevented, if nature has not implanted the sense to feel the indispensable nature of the union required, and understanding to apply it. The study of physiognomy is perhaps the best guide to its acquirement, or rather for the improvement of those who possess it.

Oftentimes the best attention of the skilful painter will be foiled, by want of co-operation on the part of the sitter; and he will be obliged to combine his expression, more from a conception of what properly belongs to the person he has before him in general character, than from what he immediately sees, unless assisted by some fortuitous circumstance. Indeed it is upon such a possession of character in the artist's own mind, that he must principally depend in this point, even under the most favourable circumstances. The living model varies too much during a sitting, both mentally and physically, to allow of mere copying; and whenever any very marked or peculiar expression is required, the general impression must be the governing principle in effecting its representation. The artist, therefore, should be very careful and minute in observation of the first favourable moments of an action or expression, when the mind of his sitter is animated, and his person alert and untired; before that weariness, which necessarily takes place when the mind is unengaged, and the body confined to one action, has displayed its influence, and destroyed the energy of the expression.

One prime object of attention more immediately required by portrait painting is colour, in which a more precise imitation of individual nature is of necessity demanded, than will answer the purposes of historical painting. Yet, although the peculiar varieties of hues and tints in complexion must be produced, in order to give correct resemblance, still somewhat of general system may be admitted in the management of them, as well as in drawing, not only without detriment, but with considerable advantage. This may be done by making the general tone of colour the governing principle, and avoiding too perplexing a degree of attention to the more minute transitions of hues; by employing such a degree of generalization as takes place when the object is removed from a very close inspection, or a very brilliant degree of illumination. It then approaches the character of historic colour, and is certainly an elevated mode of treating portraiture, if truth be the companion of the simplicity it generates. Indeed it is next to impossible to copy exactly the astonishing varieties of nature seen in a healthy, or even in a delicate complexion; and the attempt very frequently destroys the form, and weakens the impression of the whole. The best practice of the best painters agrees with this principle; of Titian more particularly. But individuality, it must never be forgotten, is the indispensable requisite of portrait painting, and must therefore be perfectly maintained; in proportion absolutely; in action, in expression, and in colour, whatever may be omitted or introduced to improve or exhibit a subject to the best advantage; whether the distance of the view be enlarged, to simplify or generalize the effect; or the quantity of illumination and management of *chiaro-scuro* be regulated, to produce beauty or force; under all circumstances, the peculiar character of the sitter must controul the pencil of the artist, and limit the bounds of his imagination.

The principles upon which colouring in portraiture depends, and the technical mode of producing it, are necessarily the same as in painting all other subjects, and are elsewhere discussed. See COLOURING, HARMONY, and HALF-TONE, in *Painting*.

By acting upon general principles of the art, when individual

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dual representation is the object, is engendered that kind of imitation which is called flattery, but which does not deserve that appellation, unless those principles are carried to excess; and that is too frequently most imperatively demanded of an artist who depends for subsistence upon the pleasures he affords the public. Gay's ingenious fable of the painter who pleased nobody and every body, is so nearly allied to facts, so exactly drawn from what is occurring every day, that, substituting names, it may be regarded as a piece of history far too true for sensible delight. Yet something of this "key to recesses of folly and pride" seems absolutely necessary; as far, at least, as may be produced by a combination of the most favourable turns of feature, and hues of colour, belonging to the subject; or relieving those parts which are most agreeable, and presenting them to the eye with as much advantage as possible; and losing such as are less pleasing in the ground of the picture. It is surely no great violence to nature, if an artist can take a review of former years, and in painting the portrait of a lady past the meridian of beauty, repair a few of the depredations committed by the ruthless hand of time, and restore her somewhat of the bloom of youth: or if, in the portrait of a man of renown, he adds a little more elevation of external appearance than may generally be displayed by the original: provided he take care, that the addition or omission he makes be congenial to the character of the subject, whatever that may be. The artist has this only way left him, to combat successfully with reality; with the advantages of motion, sense, and substance enjoyed by the living subject.

It requires much dexterity, however, to wield so dangerous yet necessary an instrument with success; and nothing is more common than to see it abused; employed to the destruction of a reputation for beauty or sense; exciting expectations which are disadvantageous to the original, and rob the natural face of its just praise or estimation, by representing too captivating an image. As it is frequently practised, even by able hands, it becomes a discreditable means of indulging vanity in the sitter, or conceit and bombast, if we may so speak, in the artist; or at best, on his part, an artful means of promoting interest at the expence of honesty, by soothing and cherishing the overweening self-love of his employers. The object in these cases seems to be, to produce a rich piece of furniture, pleasing to the eye; rather than a just representation of character, interesting and attractive to the heart.

But all pictures intended for ornament, or to excite agreeable sensations, ought to be pleasing and captivating to the eye! Granted. Yet surely it is not necessary for this end that fictitious appearances should be resorted to! that a man of humble and meek demeanour should be exhibited attempting to ape the bolder and more determined of his fellow men in action and expression! That one of a station in the middle rank of life, should be placed in a colonnade, and surrounded by the rich trappings of nobility or royalty, merely to afford an opportunity of introducing rich colours and brilliant chiaro-scuro, &c. &c. till station, rank, and character, become confounded.

Such, nevertheless, are the errors into which portrait painters, who forsake the just object of their profession, are constantly falling. If invention were justly applied, it would surely provide actions and expressions appropriate to the subject, rather than assume artificial ones; and find proper accompaniments, which, without lowering the rank or character of a man, or indeed rather elevating it, would at the same time become his station, and illustrate his peculiar capacity and inclinations. These being arranged with skill, and assisted by an ingenious management of chiaro-scuro, may

at all times be made to produce an agreeable effect. Much of the odium which attaches to the innumerable instances of this species of folly, (with which our exhibitions so frequently present us,) must, however, be removed from the shoulders of the painters, and placed to the account of that idle vanity of emulating appearances which unfortunately prevails in the world, and asserts its influence in this, as in other matters, counteracting the suggestions of reason and propriety.

In all the surrounding parts of a portrait, or those which constitute the ground from which it is relieved, or by which it is accompanied, the same knowledge of nature and of art is required for their introduction and management, as in the composition of an historical picture; but with this disadvantage to the portrait painter, that he is less at liberty to choose his materials than his rival in history; and has too frequently to work up to an uninteresting principal object, which it must be his aim to set off to the best advantage. All the technical knowledge and skill which can avail in the art, as employed in imitating every branch of nature, is required of him; and the difficulties he has to encounter fall short of those opposed to the progress of the historical painter, only in the labour of balancing extended compositions, and producing varieties of expression: in lieu of which, he has to overcome the arduous task of relieving and supporting a single figure with becoming grace or dignity, of displaying its appropriate character, and decorating it with suitable accompaniments. Oftentimes he has to render it historical, and display some particular event by action, by expression, and the introduction of explanatory matter.

On the whole, from a little reflection upon the difficulties which encompass the path of the portrait painter, it will be seen, that if he be exempt from the necessity of that general study of human nature which is required of him who undertakes to illustrate the pages of history, or embody the more fascinating illusions of poetry; he is not less called upon for exertions in other matters, which require a mind as fertile in expedient, as assiduous in labour. Nor are his productions less interesting, when we consider the object of his study as attached to the preservation of that remembrance we all love to cherish of the great and good, the wise and the beautiful; of those who in their lives made the happiness of their fellow creatures the object of their contemplation, and left them lessons of instruction, or were the sources of delight and admiration. Not to mention the more confined and individual gratification which parents, children, relatives, lovers, friends, derive from his art; the endearing sensations of affection, or of gratitude, which it is his delightful business to cherish: or the useful emulation so often excited by recollections of character, aided by so much of personal acquaintance as a portrait presents, when the original no longer enlivens society.

Most of the renowned painters, both of ancient and modern times, have blended the peculiar practice of portraiture with their other studies; and some have devoted their time to it as a principal object of attention.

Among those whose talents assisted to embalm the memory of ancient Greece by the cultivation of this delightful art, the names of Panæus, Polygnotus, Apelles, Aristides, and some few others have escaped oblivion: but unfortunately we enjoy only their renown; and must be content to form a judgment of their merits through the feelings and language of others. By the authors who mention their works, we are led to believe that they carried portraiture to the utmost degree of perfection; particularly Apelles, in honour of whose transcendent abilities, the whole vocabulary

lary of eulogium has been exhausted. See PAINTING, *History of*.

On the revival of the art of painting, in the thirteenth century, portraiture soon became an object of attention, since we find that Giotto, who died in 1336, practised it with very considerable success; and to him we are indebted for the portraits of many of the most conspicuous characters of his time. His historical pictures, as well as those of Massaccio, and all the older artists, are full of figures which bear every appearance of portraits, and some are known to be such. Most probably they painted from those heads of their friends, which suited the character they wished to introduce; and certainly that is a means of obtaining a greater degree of natural expression than mere fancy can supply. Raphael in his greatest work, the labours of the Vatican, employed the same means. Engaged by Julius II. and Leo X. to adorn the pontifical palace by the exercise of his extraordinary talents, and to celebrate the principles and triumphs of the Christian church, he did not lose sight of the renown due to such munificent patrons; and by introducing their portraits in the series of pictures he there painted, cancelled in measure the obligations conferred upon him and the art, and secured to them a portion of his own immortal fame. Many portraits of the cardinals and nobility of Rome, who were either immediate friends of the artist or promoters of the work, were also admitted; but it must be acknowledged that the anachronisms created by it, are frequently offensive to the judgment, since it is scarcely possible to separate the ideas associated with the figure of one man, whose history we are acquainted with, and imagine it to be the image of another of prior date, and character totally distinct. When portraiture is attached to an historical subject, and the real actors of the scene are introduced, it then adds a tenfold interest to the work; but in doing this, great care must be taken to treat the portraits themselves in a manner correspondent to that dignified and free style of design required of historical painting; with the omission of the minuter parts, and displaying only the distinguishing and characteristic features and forms. Both the Roman and Venetian schools have produced numberless works abounding with the anachronisms we have above-mentioned, but great examples never justify false principles, or improper conduct; and happily more modern art is free from this impurity at least.

It was not in historical pictures alone that Raphael practised portraiture, he has also left us several superior examples of portraits specifically such, of which those of Leo X. and of Julius II., in the gallery of the Louvre, demand the warmest praise for their individuality, dignity, and character. His works of this kind, however, were but few, compared with those of his great contemporary Titian, who is generally regarded as the father and head of this peculiar branch of the art, having executed it with a greater mixture of truth, simplicity, and grandeur, than any other. Giorgione died so young, that his productions in portraiture are necessarily few; but some of those are exquisitely beautiful; witness the small picture he painted of Gaston de Foix, and a servant putting on his armour; formerly in the Orleans gallery, but now in possession of the earl of Carlisle.

Lionardo da Vinci, Sebastian del Piombo, and most of the men who obtained celebrity at the period when the art of painting flourished in Italy, attended to portraiture, and there are very few of whom some examples do not remain; but the number of those who attached themselves to it entirely was small. In Spain, Velasquez attained a degree of perfection nearly rivalling Titian; but we have very few of his works in England: more rich in the labours of Vandyke,

we are better enabled to appreciate his powerful taste and talents, and may well boast of the treasures we possess, wrought by his inestimable skill. Next to him, Holbein, Janfen, More, Lely, and Kneller, are the names of those most estimable for their portraits, among the number of artists with which this country has abounded from the days of the former, till the sun of our pictorial hemisphere arose in Reynolds, the father of British art; of whom it may be doubted whether the art he displayed in uniting taste and truth, with style and effect in portraiture, in a degree far surpassing any other painter, added to a just feeling of character, does not more than counterbalance acknowledged deficiencies in drawing, and sometimes in execution; and decidedly place him at the head of this branch of the art of painting.

PORTREATH, in *Geography*, a small bay of England, on the N.W. coast of the county of Cornwall; about five miles N. of the town of Redruth. See REDRUTH.

PORTREE, or PORT-A-ROI, *i. e.* the King's-harbour, is a parish in the isle of Skye, Scotland, in the presbytery of Skye, and synod of Glenelg. The resident population in 1811 was 2729: the parish is about nine computed miles in length, by three in breadth, and its surface is diversified with hills, vallies, and plains. On the eastern side of the island the coast presents a very rugged appearance, and in many places the cliffs are nearly perpendicular. In these rocks are many caves of great extent and dimensions. A remarkable hill in this parish, called *Ait Suidhe-Thuin*, *i. e.* Fingal's sitting-place, is of rugged form, and commands very extensive prospects, in every direction. In the fresh-water lakes of Loch-fad, Loch-leathan, or the long and broad lochs, are abundance of white and red trout, flounders, and eels: the discharged water from the latter lake falls over a high and steep precipice, and constitutes a grand cascade. Here are two forts attributed to the Danes, and an old castle, formerly the seat of the lords of Raafay. Game and wild fowls are abundant here. King James I., when he visited these islands, anchored in this port, and hence arose the present name. In this village are held two annual fairs, in May and July, and are generally continued for several successive days. These are very much frequented, and at both a great number of black cattle is disposed of. In the parish are four places of worship, but only one church, which was built in 1726, when the parish itself was first constituted. Carlisle's Topographical Dictionary of Scotland, vol. ii.

PORT-ROPES, in a *Ship*, those which serve to haul up the ports of ordnance.

PORT-ROYAL, a term that makes a considerable figure in the republic of learning. Its origin is this:

Philip Augustus, wandering from his company in hunting, near Chevreuse, westward of Paris, found a little chapel, where he put up, expecting that some of his attendants might meet him. This happening accordingly, he gave the place the name of the *King's port*, *Port du roi*, or *Port-royal*; and, to give thanks for his deliverance, he resolved to erect a monastery there.

Odo, bishop of Paris, apprised of his intention, prevented him; and, with the concurrence of Mathilda, wife of Matth. Montmorenci, first lord of Marly, built a nunnery in 1204, filling it with Cistercians, who continued under the jurisdiction of the general of that order till the year 1627, when they were removed to a house given them in the Fauxbourg St. Jacques, at Paris.

In 1647, they quitted the habit of Cistercians, and embraced the institution of the perpetual adoration of the sacrament. The same year the archbishop of Paris allowed them

them to remand some of their religious to their former abbey, and to re-establish the same.

Some time after, the formulary of Alexander VII. being appointed to be subscribed throughout the kingdom, the religious of Port-royal in the city signed it: those remitted to the former abbey scrupled it extremely, and, at last, only signed it with great restrictions.

Still persisting in the same sentiments, the king finding no way to reduce them but by dispersing them, that was executed in 1709, and the revenues given to the other monastery.

Upon this evacuation, several ecclesiastics, and others, who had the like sentiments with regard to the subscription as the religious, retired to Port-royal, and had apartments there; and there published several books, both on the subject of this dispute, and other topics; whence all that adhered to that party took the name of *Port-royalists*; and their books, *books of Port-royal*.

Hence we say, the *writers of Port-royal*, *Messieurs de Port-royal*, the translations of *Port-royal*, the Greek and Latin methods of *Port-royal*, which are grammars of those languages.

PORTRUSH, in *Geography*, a small fishing town of the county of Antrim, Ireland, near the mouth of the river Bann. It is on a small peninsula, which is very interesting to the geologist, and is five miles from Coleraine.

PORT-SALE, a public sale of goods to the highest bidder. Port-sale, in the stat. ann. 35 Hen. VIII. cap. 7. denotes the sale of fish presently upon its arrival in the port or haven. It also signifies a sale of goods upon the key.

PORTSBOROUGH, or **PORTSBURGH**, in *Geography*, in the parish of St. Cutlibert and shire of Edinburgh, Scotland, is a burgh of barony, with peculiar and separate jurisdiction and privileges, although only a suburb to the city of Edinburgh. Its origin is said to have been owing to the king's stables and a chapel, which were formerly standing here, and of which some vestiges remain. Near them was a royal tilting ground. The districts of Portsborough and Potter-row, forming one jurisdiction, are governed by a baron, one of the magistrates of Edinburgh, and two bailiffs, his assistants, who are appointed by the common-council of Edinburgh. In their court of barony, these officers try all causes, both civil and criminal, except capital offences. Besides these officers the following also belong to this district: a town-clerk, a fiscal, two constables, and two sergeants, or town officers. In this neighbourhood are two ancient buildings, called Wrights-houses, and the mansion house of Marchilton. The latter was the seat of the celebrated John lord Napier, baron of Marchilton, well known for his admirable discovery of the logarithms; and to whom, says Hume, "the title of great man is more justly due, than to any other whom his country ever produced." Carlisle's Topo. Dict. of Scotland.

PORTSEA, an island of England, about 14 miles in circumference, between Portsmouth harbour and Langston harbour; separated from the main land of Hampshire by a narrow channel, over which is a bridge. In this island are Portsmouth and Portsea.

PORTSEA. See **PORTSMOUTH**.

PORTSMOUTH, a town of America, the metropolis of New Hampshire, in the county of Rockingham, and the largest town in the state, and its only sea-port, situated about two miles from the sea, on the S. side of Piscataqua river. Its harbour is one of the best on the continent, having depth of water sufficient for vessels of any burden, so defended against storms by the adjacent land, that ships may securely ride there in any season of the year; and not liable

to be frozen. It is almost impregnable by its natural situation. A light-house stands on Newcastle island, at the entrance of the harbour, in N. lat. 43° 5'. W. long. 70° 41'. Ships of war have been built in this place. Portsmouth contained 6934 inhabitants in 1810, three congregational churches, one episcopal church, one for Universalists, a state house, a school-house, a work-house, and two banks. The town was incorporated in 1633, 10 miles S.W. of York, 22 N. of Newbury-Port, 65 N.N.E. of Boston. N. lat. 43° 3'. W. long. 70° 45'.—Also, a township of good land on the N. end of Rhode island, Newport county, containing 1795 inhabitants; on the road from Newport to Bristol.—Also, a small sea-port town of North Carolina, in Carteret county, on the N. end of Corebank, near Ocrecock inlet; chiefly inhabited by fishermen and pilots.—Also, a post-town, pleasant, flourishing, and regularly built, in Norfolk county, Virginia, on the W. side of Elizabeth river, opposite to Norfolk and a mile distant from it; both which constitute one port of entry. In 1810 it contained about 300 houses, and 1702 inhabitants, including 1616 slaves, 111 miles E. by S. of Petersburg.—Also, a town on the N.W. side of the island of Dominica, in the West Indies, in Prince Rupert's bay, between the salt-works and the coast. N. lat. 15° 41'. W. long. 61° 18.

PORTSMOUTH, a large borough, sea-port, and market-town, including within its jurisdiction the town and parish of Portsea, is situated on the isle of Portsea, on the coast of the English channel, in the hundred of Portsdown and county of Southampton, England. It is distant 18 miles S.E. by E. from Southampton, the county town, and 73 miles S.W. from London. According to Camden, its origin was owing to the retiring of the sea from the upper parts of the harbour, which rendering Portchester less convenient, the inhabitants removed hither and built Portsmouth. The earliest historical notice of it occurs in the Saxon chronicle, A. D. 501, when it is mentioned by the name of Portesmuthe, as the place at which a Saxon chief, called Porta, landed, in order to assist Cerdic in the subjugation of the Belgic provinces in England. Here also Robert, duke of Normandy, disembarked a strong army in 1101, with the intent of disputing the succession to the throne with his brother king Henry I.; but the interference of the great barons forced him to relinquish his design and agree to terms of conciliation. About this period Portsmouth seems to have attained a considerable degree of importance, as it appears from history that the monarch last mentioned passed the Whitsun-week here in 1123; and that the empress Maud landed at this port with her brother Robert, earl of Gloucester, in 1140, when she came to force king Stephen to resign his usurped sovereignty to its rightful possessor.

The first charter to this town upon record was granted in 1193, by king Richard I., in which, after declaring that he retains *Portesmue*, he confers upon the burghesses an annual fair for fifteen days, and a weekly market, together with all other immunities enjoyed by the citizens of Winchester and Oxford. As a consequence of this charter, the inhabitants requested the presence of the itinerant justices, and presented Henry III. with three casks of wine, in order to prevail on him to command their attendance. About the commencement of the succeeding reign, the French, jealous of the growing trade of this town, attacked and burnt it; but it gradually revived from its embers; and in the reign of Edward IV. had again risen to such importance, that he began to secure it by fortifications, which were carried on and greatly extended by his successor, Richard III., who, though generally represented as a bloody tyrant, was unquestionably

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tionably a wife and politic monarch. From that period Portsmouth increased rapidly both in strength and importance, till, in the reign of Henry VIII., it had become the principal naval arsenal in England. Leland, who visited it in this reign, describes it as follows in his Itinerary: "The land heere, on the est side of Portesmuth haven, rennith farther by a great way strait into the se, by south-est at the haven-mouth, than it doeth at the west poynte. Ther is at this point of the haven Portesmuth toun, and a great round toure, almost doble in quantitie and strenkith to that that is on the west side of the haven right agayn; and heere is a mighty chayne of yren, to draw from toure to toure. About a quarter of a mile above this toure is a great dok for shippes, and in this dok lyeth part of the rybbes of the *Henry Grace of Dieu*, one of the biggest shippes that hath been made in *hominum memoria*. Ther be above this dok crekes in this part of the haven. The toun of Portesmuth is murid from the est tour a forough length with a muddle waulle armid with tymbre, whereon be great pieces both of yren and brazen ordinauns; and this piece of the waulle having a ditch without it rennith so far flat south-south-est, and is the place most apt to defend the town ther open on the haven. Ther rennith a ditch almost flat est for a space, and wythin it is a waulle of mudde like to the other, and so theus goith round aboute the toun to the circuit of a myle. Ther is a gate of tymbre at the north-este end of the toun, and by it is caste up a hille of erth ditched, wherein be gunnes to defend entre into the toun by land. Ther is much vacant ground within the toun waulle. Ther is one fair stret in the toun from west to north-est. I lernid in the toun that the toures in the haven-mouth were begon in king Edwarde the 4th's time, and sette forward in buylding by Richard the 3d. King Henry the 7th ended them at the procuracion of Fox, bishop of Winchester. King Henry the 8th, at his first warres into Fraunce, erected on the south part of the toun three great bruing houses, with the emplements to serve his shippes at such tyme as they should go to the se in time of warre. One Carpenter, a riche man, made of late tyme in the mydle of the High-streate of the toun, a toun-houfe. The toun is bare and little occupied in time of peace."

Henry VIII. was the first monarch under whom the English navy obtained a systematic establishment; for though his predecessor had made Portsmouth a royal dock, and had built the ship called *the Great Harry*, yet he continued the old practice of applying to the merchants, and to the different ports of the kingdom, for the supply of ships wanted for the public service. That custom Henry abolished, and rendered the building and equipment of the national fleet a public concern. For this purpose he erected a navy office, and ranged all his ships into different classes, keeping a regular inventory of them and of the various stores. (See Derrick's Memoirs, &c. of the Royal Navy, 4to. 1806.) In his reign Francis I. of France attempted the destruction of Portsmouth; but the armament which he dispatched on the enterprise was so gallantly received by the English fleet lying at anchor off Spithead, that after a series of attacks, during two days, it was forced to retire without effecting its errand. In this engagement the English lost one of their largest ships, which was commanded by sir George Carew.

Even in the time of Edward VI. Portsmouth was the only dock-yard that could be considered as a national one; indeed, it was almost the only naval station in England. All the ships in the public service, amounting to fifty-three in number, lay in this port, with the exception of three, two of which lay at Deptford and one at Woolwich. The crews belonging to these vessels, including soldiers, marines,

and gunners, did not amount to 8000 men; yet from such beginnings has the naval power of England risen to a height unparalleled in the history of the world. Edward, sensible of the great consequence of this port to the future glory of his kingdom, augmented its fortifications by the addition of two strong castles. In the time of Charles I. some improvements were likewise made in the defences of Portsmouth; and here the armament, destined to relieve the Protestants in Rochelle, assembled under the eye of the king's favourite, the duke of Buckingham, who was assassinated in a house in High-street by Felton, a lieutenant in one of the regiments ordered for embarkation.

During the civil wars, this town was garrisoned for the parliament. Charles II., who married here Catharine, infanta of Portugal, greatly enlarged its fortifications, particularly by surrounding South-sea castle with a kind of star fort. William III. also made considerable additions to the works; and since the year 1759, when the star fort was nearly destroyed by an accidental explosion, several grants have been made by parliament to repair the fortifications, and render them more complete. The most recent additions are the fortifications on the Portsea side; and here the line is so well secured, that the approaches of an enemy can only be made in front; and even there but on few points. From the elevation of the works, the whole adjacent country is commanded by them; the ditches are wide and deep, and the entire line is further secured by strong and capacious outworks. At the head of the creek which separates Portsea from Portsmouth, is an extensive ravelin, connecting these works with the fortifications of the latter town, which extending along the beach to South-sea castle, form a noble semicircular terrace, upwards of a mile in length.

Early in the last century, the scite within the then fortifications of Portsmouth having become too limited for its increased population, an open common on the north side of the town was chosen as a convenient spot for the erection of additional buildings. As these became inhabited, more were constructed, till at length the offspring outgrew its parent town, and assuming consequence with extent, discarded its original appellation of "Portsmouth Common," and acquired, under the sanction of the legislature, the title of "The Town of Portsea;" but it is properly only a part of Portsmouth, being locally situated within the borough, and subject in every respect to the jurisdiction of its magistracy. It is, however, unquestionably the more important division of the town, for though, from its greater antiquity, Portsmouth preserves its dignity and precedence in still being the seat of the civil and military establishments, and the residence of the port-admiral, Portsea has the advantage of having both the dock-yard and the gum-wharf within its precincts. The first, which must be considered as the germ of all the modern consequence of the port, is of great extent, and contains within its boundaries every article which can possibly be wanted for the supply of the navy. It is entered from the town by a lofty gateway, after passing which, the first objects that attract attention, are the porter's residence, the malt-houses, and a large modern guard-house. A little further on stands the pay-office; and beyond it is the royal naval academy, which consists of a centre and two wings. This building is furnished with every requisite accommodation for naval instruction, and has an excellent observatory on its summit. The commissioner's house next appears, and to it succeeds an immense range of store-houses, to the right of which is a handsome modern chapel; thence a visitor is generally conducted through the anchor-wharf, where hundreds of anchors of every size and description

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description are piled up ready for immediate service; then to the rope-house, a spacious pile three stories high, 54 feet broad, and 1094 feet long. Here the cables are formed with immense labour; but of late years the operation is much facilitated by the use of machinery. The operations in this division of the yard are particularly ingenious and highly interesting. Leaving it, and passing various store-houses, stables, and other buildings, and many vast piles of timber for the service of the yard, a sort of square presents itself to the view, and displays in its centre a statue of William III. in a Roman habit. On the east side of this square is a row of handsome houses appropriated for the residence of the chief officers of the yard, and on the north and south sides are various offices, store-houses, &c. Proceeding onwards, the next impressing object that arrests the attention, is the vast building called the anchor forge, and on entering it, both the eye and ear are confounded by the terrific noise and cyclopean scenes, which spread throughout this Vulcanic abode. Many of the anchors which are here wrought weigh from 70 to 90 tons each. Approaching nearer to the harbour the visitor now beholds numerous ships of war upon the stocks, either building or repairing; a sight peculiarly calculated to excite the most lively interest in the breasts of all Englishmen, who feel solicitous about the safety and the glory of their native country. The jetty heads, with the basins and docks, are next in order, and, with the shipping in the haven, present a very grand and imposing spectacle, to which the extraordinary capaciousness of the new range of docks greatly contributes. These immense works are all peculiarly adapted for their respective purposes, and while the ships are under repair are kept completely dry; but in their immediate vicinity, the depth of water is sufficient to float the largest vessels in the navy. Many other parts of this celebrated arsenal, and particularly the rigging houses, claim the examination of the curious, but our limits forbid us even to mention them in detail. The number of workmen employed in this dock-yard is very great, but varies considerably. In time of peace seldom fewer than 2000 are kept at constant work in its different departments; and during war this amount is frequently doubled, and even tripled. The officers, who have regular appointments, are a commissioner, with three clerks, a clerk of the cheque, a store-keeper, a master shipwright, a surveyor's clerk, two master attendants, an extra master attendant, three assistant master shipwrights, a clerk of the rope-yard, a master rope-maker, a boatswain, a purveyor, a master boat-builder, a chaplain, surgeon, &c. Here, as at Plymouth, the workmen receive sixpence a day as a commutation for their former perquisite of chips.

Notwithstanding that every precaution that can be devised is taken to guard against the destructive element of fire, three great conflagrations have occurred in this dock-yard since the year 1760. The first, which appears to have been accidental, broke out in the night of the 3d of July, 1761, and raged for a long time with dreadful fury. The night had been extremely tempestuous; and the fire was attributed to the lightning striking upon the hemp store-house, the windows of which had been left open to air it. By this conflagration many hundred tons of tar, 500 tons of cordage, 700 sails, and 1050 tons of hemp, were totally consumed. The second fire occurred on the morning of the 27th of July, 1770, when the damage done was still greater; and it was even for some time doubtful whether any part of the yard would escape destruction. From its bursting forth at different places at one time, and various other circumstances, great suspicions were entertained of its having been occasioned intentionally, but the officers were

unable to discover the offenders. The third fire happened on the 7th of December, 1776, and in this instance was undoubtedly the effect of design, as the incendiary was traced, tried, condemned, and executed, upon incontestible proof, afterwards confirmed by his own confession. The real name of this malefactor was John Aitken; but the appellation by which he is commonly known is that of "Jack the painter." He is supposed to have acted under foreign influence, and had previously attempted to destroy the docks at Plymouth and Bristol, but failed in both those attempts, though he excited very considerable alarm. His plans were laid with great sagacity and forethought; and in order the more effectually to ensure their success, and avoid suspicion, he had invented a very ingenious machine, which he contrived to lodge among the cordage over night, and setting fire to it, left it, and passed out of the gates in the morning unmolested. In the course of the same day the fire broke out, as it luckily happened, several hours before the incendiary had purposed, for had it not begun to display itself till after the fall of night, the destruction would probably have been much greater than it was. The immediate and effective assistance which was given to check the progress of the flames, and the favourable direction of the wind, confined the damage to the rope-house, and a few adjoining store-houses. Jack immediately quitted Portsmouth, but was apprehended about two months afterwards, and his villainy being distinctly traced, he suffered the penalty of the law on the 7th of March, 1777, having previously made all the reparation to his country in his power, by pointing out some effectual measures for securing the dock-yards from similar attempts.

The gun-wharf, as before mentioned, is likewise included in the Portsea division of the town. This arsenal contains several ranges of buildings for the reception of the naval and military artillery, stores, &c. Some of the store-houses are vast piles, particularly two, which, with their dependencies, are adapted to contain all kinds of necessaries for the sudden equipment both of a fleet and an army. On the wharf is the grand depot for guns, carronades, and mortars, with shot and shells of almost every weight and size, all of which are arranged in immense piles of a pyramidal form. Here also in times of peace, the guns from the ships in ordinary at this port are lodged; each ship's guns being kept in a separate tier, while the carriages are deposited away in the same regular manner in proper store-houses; so that the whole may easily and readily be re-embarked. The small armoury is a spacious building of late erection, capable of containing 25,000 stand of arms, and furnished with apartments appropriated to the artificers employed to keep the arms in complete readiness for service. The houses of the store-keeper, and of other officers, who have the charge of the gun-wharf, are large and handsome structures.

Of the buildings dependent on this grand naval emporium, which are situated in the Portsmouth division of the town, the principal are the victualling-office, the government-house, the houses of the lieutenant-governor and port-admiral, and the marine and military barracks. The victualling-office comprehends several extensive ranges of building, including a very magnificent house for the agent victualler; and a large store-house, occupying the whole length of St. Thomas-street, in which the provisions and liquors prepared for the supply of the navy are kept. Other houses are appropriated to the business of salting and baking. The grain for the latter purpose is ground at King's mill, on the Portsea side, which is put in motion by a stream of salt water, admitted from the harbour by means of a great sluice on the creek, which separates the towns. This sluice, or mill-dam, is

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closed at high water, and on the ebbing of the tide, the water is again passed off into the harbour.

The government-house is situated at the upper end of the grand parade, and is said to have formed originally part of an ancient hospital, mentioned by Leland as having been founded by bishop Peter de Rupibus, for twelve poor men. At present, however, it possesses but few traces of its monastic origin, owing to the frequent additions and alterations it has sustained. During the governorship of the late sir William Pitt, K. B., many improvements were made in this mansion, so that it is now a most elegant and eligible residence. Near it stands the ancient chapel of the hospital, now converted into apartments for the use of the officers and soldiers of the garrison. The houses of the lieutenant-governor and the port-admiral are likewise handsome and convenient buildings; especially the latter, which is situated in High-street.

The borough of Portsmouth, as before mentioned, received its first charter of incorporation from king Richard I. Since his time, however, various charters have been granted by his successors, confirming its former privileges, and adding others. The last charter is that of Charles I., in virtue of which the government of the town is now vested in a mayor, recorder, twelve aldermen, and an indefinite number of burgessees, with some inferior officers. This borough sends two members to parliament, who are elected "by the mayor, aldermen, and burgessees." The number of voters is usually about 110, but as the burgessees are unlimited, it occasionally varies. Some very curious particulars relative to the parliamentary history of Portsmouth, are mentioned in the History of Boroughs; but as our limits prevent us from stating them in detail, we must content ourselves with referring the reader to that work. The town-house, in which the business of the corporation is transacted, and the borough courts, are held in a large building injudiciously situated near the middle of the High-street. This edifice was repaired and enlarged in 1796. Beneath it is an open space, which serves as a market-house; and at a short distance from it stands the White-house, or town prison, which is fitted up and regulated in a manner highly creditable to the magistrates, and officers under whose superintendance it is placed.

Portsmouth and Portsea, being parochially distinct, have each a separate parish church. That of Portsmouth, dedicated to St. Thomas à Becket, is a spacious structure, and has been erected at different periods. It contains behind the altar a large and elaborate cenotaph, in memory of the duke of Buckingham, the favourite of Charles I. Portsea parish church being two miles distant from the town, at a hamlet called Kingston, cannot of course be conveniently attended by the inhabitants. Its place, however, is sufficiently supplied by several handsome chapels, of which the principal are respectively dedicated to St. James and St. John. The latter, which was consecrated in 1789, is particularly elegant in its interior decorations. Besides these places of worship, there are a number of meeting-houses, belonging to various denominations of dissenters.

Among the charitable institutions here, was a free grammar-school, founded in the last century by Dr. Smith, a physician of Portsmouth, but this has already become a sinecure. There are, however, several other schools of more effective use, particularly one under the patronage of a friendly society, which is held in Society-hall, and includes among its members many gentlemen of the first respectability in Hampshire. Here are also an alms-house for eight poor widows; and two poor houses, one belonging to Portsmouth, and the other to Portsea. In the latter parish, the parish officers virtually hold their appointments for life,

and are generally nominated, by the chief officers, from among the shipwrights in the dock, who are deemed worthy of preferment. These manage their duties much better than their neighbours in Portsmouth, and comparatively at a far inferior expence. Both towns are now completely paved, though the paving of Portsea only commenced in 1792. The ancient regulations of watch and ward are still in force in the latter town; but in Portsmouth regular watchmen are established, who are paid by a rate collected from all the housekeepers.

The commercial character both of Portsmouth and Portsea, in common with most of the great sea-ports of England, was greatly improved during the second half of the last century; so that even in time of peace, the trade was considerable. It is, however, in a great measure owing to the long continuance of the late wars, that they owe their present affluence and prosperity. What effect the return of peace will have upon them remains to be seen; but that event must naturally be expected to retard their progress for a time, till the inhabitants are enabled to turn their capital and industry into channels different from those which convey nourishment to the sinews of war. The custom-house is situated in Broad-street, which forms part of the western suburb, or Portsmouth Point, which is admirably situated for commerce, and possesses every requisite accommodation for shipping and goods. At the Point, and close to the mouth of the harbour, is a large commodious bathing-house.

Portsmouth, according to the parliamentary returns of 1811, contains 1103 houses, and 7103 inhabitants; Portsea 6011 houses, and 33,464 inhabitants, making together a population of 40,567 persons. The market-days here are Thursday and Saturday weekly; and there is an annual fair, or free mart, originally granted by king Richard I., which continues for fifteen days after the 10th of July; during which period, no person can be arrested for debt within the precincts of the borough. This fair is held in High-street. Here are several extensive breweries; and besides the public buildings already mentioned, are a bank, erected on the parade, and a theatre, which is the chief place of public amusement in the town, and remains open the greater part of the year.

For capaciousness, depth, and safety, Portsmouth harbour decidedly excels every other in Great Britain. Secure from the most violent storms, the largest first-rates may ride here at the lowest ebb, without touching ground; and its extent is almost sufficient to contain the whole navy of England, great and numerous as it is. Every where the anchorage is good; and the whole harbour is so completely free from bars or impediments, that even a first-rate can make sail at any time of the tide, and quit it by the deep water under South-sea Castle. It is moreover almost completely secured from assault, by the strength and number of the batteries which defend it, particularly towards the sea, where the guns are nearly on a level with the edge of the water. But though safe from storm and attacks, it cannot be secured from the effect of fire, occasioned either by accident, design, or carelessness. It has, therefore, been at different times the scene of awfully grand and calamitous spectacles, from the rage of that destructive element. During the war of 1793, the *l'Impetueux* of 74 guns and the *Boyne* of 98 guns were both destroyed by fire in this harbour, and occasioned considerable damage to other vessels, and loss of lives, by the explosion of their magazines. For some further account of this harbour, see *SPITHEAD*. Beauties of England and Wales, vol. vi. by John Britton, F. S. A., and E. W. Brayley. History of Boroughs.

PORT-SOKEN, or **PORT-SOKA**, the suburb of a city; or a place within the liberties or jurisdiction of it.

The word is formed from the Saxon *port*, *city*, and *soka*, *jurisdiction*. "Concessi, quod nullus de civitate, vel port-foka sua captus, &c." *Sonn. Gavelkind*.

PORTSOY, in *Geography*, in the parish of Fordyce, and shire of Bamff, Scotland, is a market town and place of considerable consequence for fishing concerns. It is seated on the shore of a bay of its own name, on the Moray Firth, at the distance of 171 miles N. of Edinburgh. A species of jasper, called Portsoy-marble, abounds here, and is manufactured into various and curious ornaments. A beautiful granite, of a flesh colour, is also obtained in this parish. It contains a quantity of felspar, which is nearly as brilliant as the Labrador spar. In the first volume of the Edinburgh Philosophical Transactions is an interesting and particular account of this singular stone, by Dr. James Hutton. It is found only at Portsoy, and in Arabia. In Portsoy are a considerable manufacture of thread, and three public schools. *Carlisle's Topographical Dictionary of Scotland*.

PORT-VENT, in an organ, is a wooden pipe, well closed, which serves to convey the wind from the bellows to the found-board of the organ.

PORTUGAL, in *Geography*, a country of Europe, bounded on the N. and E. by Spain, on the S. and W. by the Atlantic ocean, and lying between 37° and 42° N. lat., and between 9° 40' and 5° 50' W. long.; being about 360 British miles in length, and 120 in breadth, and supposed to contain about 27,280 square miles, which, allowing the population to be 1,838,879, will give 67 inhabitants to each square mile. Others have computed that Portugal contains 2740 Portuguese leagues, of 17 to the degree; and have stated its population as exceeding the above-mentioned number by nearly half a million. Its ancient name was Lusitania; but its boundaries were different. (See **LUSITANIA**.) Its present name is derived from that of an ancient town called "Calle," on or near the site of the present Oporto, which was called "Porticale," or the port of Cale; and in process of time the name of this port was extended to the whole country, and hence was formed Portugal. The old name of Lusitania is said to have been discontinued, and the new one to have been substituted for it under Ferdinand the Great, king of Castile and Leon. The most ancient writing extant in which the name of Portugal occurs, is dated in the year 1069.

Portugal was anciently occupied by the Phœnicians and Carthaginians, and from them it passed to the Romans, under whose dominion it was made by the emperor Augustus a Roman province. Towards the end of the fifth century the Alans, about the year 440 the Swabians, and about the year 582 the Visigoths, took successive possession of this country. In the eighth century it was over-run by the Moors and Saracens, and recovered from them by the Christians. Henry, duke of Burgundy, having aided Alphonso VI. king of Castile, against the Moors, obtained his daughter Theresa in marriage, in 1093 was created earl of Portugal, and in 1110 received from him the absolute property of this kingdom. Henry died in 1112. His son and successor, Alphonso Henriques, having gained a signal victory in the battle of Ourique over five Moorish kings, A. D. 1139, was proclaimed king by his army on the field of battle. In 1148, by the assistance of a fleet of Crusaders, he seized Lisbon, the capital of the kingdom; about the same time he also assumed the title of king; so that this may be considered as the epoch of the Portuguese monarchy, his right to the throne being confirmed in 1179. In 1181 he held an assembly of the states at Lamego, in which the succession to the

crown was settled. Alphonso died in 1185, aged upwards of 90. About the year 1254, Alphonso III. completed the conquest of Algarve. In the year 1290 Dionysius founded an university at Lisbon, which he removed in 1308 to Coimbra. Alphonso IV. A. D. 1340, gained over the Moors the famous battle of Saladin, in which, according to the reports of Spanish writers, 200,000 Moors fell victims. He was likewise successful at sea against the Moors of Africa. From the year 1369 to 1431, the kings of Portugal had frequent contests with those of Castile, but with various success. In the fifteenth century Portugal attracted the admiration of Europe by her naval expeditions and commercial discoveries. In 1415, John the Great, king of Portugal, carrying his arms into Africa, and taking the city of Ceuta, gave an impulse to the national spirit, and in 1420 the Portuguese were in possession of Madeira. In 1422, the computation of time by the years of the Christian era was introduced into this kingdom. The Portuguese discoveries in Africa proceeded under John's successors, Edward and Alphonso V., and the auspices of prince Henry, until in the reign of John II. they extended to the Cape of Good Hope; and in that of Emanuel, A. D. 1498, Vasco de Gama opened the passage to the East Indies. By this successful adventure the trade of Asia was diverted from its old channel across the isthmus of Suez, and down the Red sea, and thus the commercial pre-eminence of Venice was destroyed by the wise and resolute measures of this magnanimous sovereign. The Portuguese in 24 years erected a commercial empire in the East, which, for extent, opulence, and splendour, had no rival in the history of nations. In the same reign Brasil was discovered and taken possession of by the Portuguese. The Inquisition was introduced into Portugal by John III. in 1526; from which time this monarchy rapidly declined. Sebastian, the son and successor of John III., led a powerful army into Africa on an unwise expedition in 1577, the event of which was his own destruction and that of his army by Muley Moloch, emperor of Morocco; the consequence of which fatal measure was, that upon the death of cardinal Henry, Sebastian's uncle and successor, Portugal, thus enfeebled and dispirited, was seized by Philip II. king of Spain, A. D. 1580. The male line of the kings of Portugal failing, the kingdom was united to that of Spain; and this event was followed by the loss of the foreign acquisitions of the Portuguese, and by a degree of oppression, which induced them, A. D. 1640, to shake off the Spanish yoke, and to elect John, duke of Braganza, a descendant of the ancient royal family by the male line, for their king, under the appellation of John IV. After his death the Spaniards made frequent attempts to regain the kingdom, but his queen, aided by Charles II. of England, vigorously resisted their efforts, till at length, in 1665, the signal victory of Montes Claros terminated the war. In November 1807, the French invaded Portugal, and caused the royal family, with their servants and treasures, and many friends, to embark on board a fleet in the Tagus, and to sail to Brasil. Since that time, the English, affording powerful assistance to the Portuguese, have driven the invaders out of the kingdom; and the Portuguese themselves, under the auspices of Wellington and Beresford, have in a considerable degree recovered that reputation for bravery and skill, which their ancestors had manifested in their contests with the Moors and Spaniards.

Portugal is divided into six provinces, as follow: 1. Entre Douro e Minho; 2. Tras-os-Montes; 3. Beira; 4. Estramadura; 5. Alentejo; 6. Algarve: the two first being situated on the N. of the kingdom, the next two in the middle, and the two last in the south. See each under its appropriate

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appropriate arrangement. The population of the whole is, according to Boetticher, 1,838,879; and by Murphy's statement, 2,588,470, which last is probably an exaggerated enumeration. The cities of Portugal are computed at 22 or 23, some of which are very small; the villas or municipalities are 350; the villages are very numerous; and the parishes not fewer than 4262. The following state of the population was drawn up by the researches of the magistrates, and published in 1802.

	Parishes.	Hearths.
Entre Douro e Minho -	1327	181,593
Tras-os-Montes - -	711	77,054
Beira - - - -	1292	224,449
Estremadura - - -	420	120,333
Alentejo - - - -	369	76,246
Algarve - - - -	71	25,523
Lisbon and the <i>banlieue</i> - -	72	54,954
	4262	760,152

It is supposed that 10 fires give 38 persons, because many live solitary, who in other countries are with their relations and friends; but in Lisbon five persons may be allowed to each hearth, because many persons live together, and there are more domestics. But when the total population is computed at 2,900,000, there seems to be some exaggeration. Of the colonies belonging to Portugal, that established in Brasil is the chief; and it has still many settlements on the coasts of Africa, with Goa and Macao in the East Indies, which are now mere relics of former great power and authority.

The government of Portugal is an absolute and hereditary monarchy; but in case of the king's demise without male issue, he is succeeded by his next brother, whose sons, however, have no right to the crown till confirmed by the states. The prince of Brasil was appointed regent by his mother, the heiress of the kingdom. The chief articles of the constitution are contained in the statutes of Lamego, issued by Alphonso I. in 1145. The king's titles are numerous; that of the heir apparent is prince of Brasil; his eldest son prince of Beira. The councils of state are, 1. That of the palace, which is supreme in justice, and has all the powers of a lord chancellor. 2. That of the inquisition, declared *royal* by king Joseph, though before it was only *papal*, with four inferior chambers at Lisbon, Evora, Coimbra, and Goa. 3. That of the finances. 4. That of the colonies. 5. That of honour, or the affairs of knights. 6. That of war. 7. The admiralty. There are five sovereign courts of justice, at Lisbon, Porto, Bahia, Rio Janeiro, and Goa. The administration lies with four ministers and secretaries of state, one at the head of the treasury or finances, another minister of the interior, another of war and foreign affairs, and the fourth, of the marine and colonies. The council of state, nominated by the prince in 1796, and consisting of thirteen members, is only assembled on solemn occasions. There are five royal councils which judge without appeal; two for Europe, at Lisbon and Oporto; two for Brasil, at Bahia and Rio Janeiro; and one for Asia, at Goa. By an edict of August the 4th, 1769, no law has positive authority except the ordinances of the king; but the Roman law may be consulted as "written equity." The military governments are seven; the six provinces and the government of Oporto, consisting of a part of Beira and a part of Entre Douro e Minho. There are twenty-eight regiments of infantry, twelve of cavalry, five of artillery, one of light troops, all strengthened according to circumstances. In 1798 there were forty-three regiments of regular militia. The army is

usually computed at about 24,000; and the militia amounts perhaps to the same number. The naval force, which was once considerable, is now reduced to thirteen sail of the line and fifteen frigates. The revenue is calculated at 2,000,000 sterling; and the gold of Brasil mostly passes to England in return for articles of industry. According to MS. notes, cited by Pinkerton, the revenue may be computed at more than 70,000,000, and the national debt, about 100,000,000 French livres. Portugal retains small influence in the political scale of Europe: her commerce is almost wholly dependent on England; and by land she is exposed to no danger except from Spain, or by consent of Spain. What will be her condition, now the troubles of Europe have, it is to be hoped, terminated, time must discover.

The religion of Portugal is the Roman Catholic, and a strict observance of its external ceremonies forms one of the national characteristics. Here are two archbishoprics in Europe, the title of patriarch being given by brevet to the archbishop of Lisbon, and three in the colonies; 14 bishoprics in Europe, and 16 in the colonies; the number of parishes is about 4000; the convents of men in Europe are 417, and of women about 150; the secular clergy about 22,000, monks 14,000, nuns 10,000, all in Europe.

The manners and customs of the Portuguese are discriminated into those of the northern and southern provinces; the former being more industrious and sincere, the latter more polite and indolent. In general, the Portuguese are an elegant race, with regular features, embrowned by the sun, and dark expressive eyes. The women are commonly of small stature, but graceful and beautiful. The Portuguese admire round limbs, and a green, or sea-green, eye. Ladies of rank resemble their ancestors in industry, by spinning flax from the distaff; the dress resembles the Spanish, but the men prefer the French, with the exception of a large loose cloak. The peasantry remain the miserable vassals of the Fidalgos, or gentlemen. In diet, the Portuguese are temperate, or rather abstemious. The games are billiards, cards, and dice; but the chief amusement is that of bull-fights. The arts and sciences are almost wholly neglected, except by a few among the clergy. Pombal introduced the sciences by force; but since his administration, they have daily diminished.

The Portuguese language is grave and solemn; but would have been little known among foreigners, if it had not been diffused by the fame of the Lusiad. The literature of Portugal may be said to have commenced with Deniz, the sixth sovereign, who cultivated poetry and the belles lettres, and founded the university of Coimbra. Many of her poets have acquired reputation. In mathematics Pedro Nunez distinguished himself at the beginning of the 16th century. Natural history has lately engaged attention; but Portugal is the last of nations in this department. Education has been much neglected. At Coimbra the students are computed only at 800. The university at Evora, founded in 1533, has remained suppressed since 1759; and the royal academy at Lisbon no longer exists.

The Portuguese manufactures are few, and of little importance. Hats and paper have been lately fabricated at Lisbon; but the chief manufactories are those of woollen cloth at Covilhã, Portalegre, and Azeitão. A considerable commercial intercourse subsists with England; and the balance in favour of the latter appears to be about 400,000 sterling, and Ireland gains by her exports about 63,000 annually. Besides woollens and hardware, England transmits to Portugal large cargoes of salted and dried fish, the last article amounting to about 200,000 annually. The exports of Portugal are chiefly wine, oil, oranges, lemons, figs,

figs, fugar, cotton, cork, drugs, and tobacco. Portugal also maintains a considerable trade with Brasil, the inhabitants of which are computed at about 900,000. The articles exported to America are chiefly woollens, linens, stuffs, gold and silver lace, fish dried in Portugal, hams, sausages, &c. with glass manufactured at Maranhã. Brasil returns gold, silver, pearls, precious stones, rice, wheat, maize, fugar, molasses, ornamental timber, &c. The drugs, spices, and articles used in dyeing ought also to be mentioned. The trade with the East Indies is inconsiderable, and that with the other European nations hardly worthy of notice.

The climate of Portugal is well known to be excellent and salubrious. The face of the country is generally fertile, though not without many declivities, especially in the N.E. corner, where is found a considerable cluster of mountains. The numerous vineyards, and groves of orange and lemon trees, conspire with the crystal streams and verdant vales, to impart great beauty and diversity to this favoured country. The soil is generally light; but agriculture is neglected.

Of the rivers of Spain, those most worthy of mention are the Tajo, the Mondego, the Soro and the Cadaon. The lakes are not deserving of notice. Of mountains, besides the cluster already mentioned, we might enumerate the chains of Idubada, Arrabeda, which is chiefly calcareous, and affords beautiful marble, of Toledo, Estrella, and Monte Junto. The zoology of Portugal is much the same with that of Spain (which see); the horses, however, are much inferior, but the mules are hardy and strong. The oxen are sometimes equal in size to those of Lincolnshire, but cows are rare, as the pastures are not duly regarded. Sheep also are neglected; but swine abound, and being fed with excellent acorns, the Portuguese hams are justly esteemed. The mineralogy of Portugal has been as much neglected as its agriculture. In the northern provinces there are traces of ancient mines which have been disregarded for many ages. Gold is still found in the sand of some streams; a mine of silver was worked near Braganza about the year 1628; tin was also found in the northern provinces, and near Miranda was formerly a manufactory of pewter. At Murfa, Lamego, and Cogo, there are lead mines; and the galena ore is very productive of silver. Copper is found near Elvis, and in other districts; iron mines are neglected for want of fuel; nevertheless, coal is found in different parts of the kingdom; and that of Buareos in particular supplies the royal foundery at Lisbon. Emery is found near the Douro, and beautiful marbles are abundant in various parts of the kingdom. Fine granite, talc, amianthus, felspar, fuller's earth, antimony, manganese, bismuth, and arsenic, are obtained in various places. Near Castello-Branco are mines of quicksilver. Portugal furnishes rubies, jacinths, beryl, and in short minerals of almost every description, and nothing is wanting to render them profitable but fuel and industry. Here are also various kinds of mineral waters and baths. For other particulars we refer to our account of the principal cities, towns, mountains, rivers, &c. and also to Murphy, Link, Pinkerton, and Playfair's Geography.

PORTUGALETE, a town of Spain, in the province of Biscay, situated on a bay of the Atlantic; 12 miles N.W. of Bilbao. N. lat. $43^{\circ} 20'$. W. long. $3^{\circ} 2'$.

PORTUGALICA TERRA, *Earth of Portugal*, in the *Materia Medica*. See LUSITANICA rubra bolus, and BOLE.

PORTUGHESSA, in *Geography*, a river of South America, formed by the union of the Pao and Bariquicemeto, which joins the Apura, 40 miles N.W. of Cabruta.

PORTUGUESE *Man of War*, in *Natural History*, a name which the seamen give to the *holothuria physalis* of

Linnaeus. It consists of a small bladder, about seven inches long, very much resembling the air-bladder of fishes, from the bottom of which descend a number of strings, of a bright blue and red, some of them three or four feet in length, which, upon being touched, sting like a nettle, but with much more force. On the top of the bladder is a membrane, which is used as a sail, and turned so as to receive the wind which way soever it blows. This membrane is marked in fine pink-coloured veins, and the animal is in every respect an object exquisitely curious and beautiful.

PORTUGUESE *Coins*. See COINS.

PORTUGUESE *Measure*. See MEASURE.

PORTULA, in *Botany*. See PEPLIS.

PORTULACA, an ancient Latin name, whose supposed origin has exercised the ingenuity of the learned, but concerning which we find nothing worth explaining or controverting.—Linn. Gen. 240. Schreb. 323. Willd. Sp. Pl. v. 2. 859. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 147. Juss. 312. Tourn. t. 118. Lamarek Illustr. t. 402. Gærtner. t. 128.—Class and order, *Dodecandria Monogynia*. Nat. Ord. *Succulentæ*, Linn. *Portulacæ*, Juss.

Gen. Ch. *Cal.* Perianth superior, cloven, small, permanent, compressed at the summit. *Cor.* Petals five, flat, erect, obtuse, larger than the calyx. *Stam.* Filaments numerous, capillary, half the length of the corolla; anthers simple. *Pist.* Germen superior, roundish; style simple, short; stigmas five, oblong, the length of the style. *Peric.* Capsule covered by the calyx, ovate, bursting all round, of one cell, with an unconnected receptacle. *Seeds* very numerous, small, roundish.

Ess. Ch. Petals five. Calyx in two divisions. Capsule of one cell, bursting transversely.

From this genus, as it stands in Linnaeus, is now separated the TALINUM of Adanson and Jussieu; see that article hereafter. This last-named genus has a capsule of several valves, separating vertically, in the usual manner, and the seeds are tunicated. *Portulaca* therefore, in Willdenow, consists of but five species, four of which are enumerated in Hort. Kew.

1. *P. oleracea*. Garden Purslane. Linn. Sp. Pl. 638. Willd. n. 1. Ait. n. 1. Decand. Pl. Grasses, t. 123. (*Portulaca domestica et sylvestris*; Ger. Em. 521.)—Leaves wedge-shaped. Flowers sessile.—Native of Europe, America, and the East Indies. It is also said to be one of the few plants found on the little island of Ascension. With us it is only a kitchen-garden herb, of no very general use at present. It was formerly much eaten in salads; nor is it unpalatable, though very mucilaginous, when boiled. Nothing can be more easy of culture than this hardy annual, which sows itself spontaneously. The whole herb is smooth and succulent, much branched, and spreading widely in a decumbent manner; the stem round and purplish. Leaves clustered, stalked, obovate, above an inch long. Flowers clustered, sessile, terminal, small, yellow, opening but for a short time towards noon.

2. *P. pilosa*. Hairy Purslane. Linn. Sp. Pl. 639. Willd. n. 2. Ait. n. 2. Gærtner as above. (*P. corasfatica lanuginosa procumbens*; Herm. Parad. 215. t. 215.)—Leaves awl-shaped, alternate; with axillary hairs. Flowers sessile, terminal.—Found in the West Indies, and brought early to this country, where it is sometimes cultivated for curiosity in the stove, being a tender biennial, flowering in summer. The stem is branched, either erect or procumbent. (The former variety, as it is esteemed, being described and figured by Hermann, at p. 214.) The leaves are copious, slender, accompanied by bristly hairs. Flowers terminal, of a beautiful pink, surrounded with similar hairs.

3. *P. quadrifida*

3. *P. quadrifida*. Creeping Annual Purslane. Linn. Mant. 73. Willd. n. 3. Ait. n. 3. Jacq. Coll. v. 2. 356. t. 17. f. 4.—Flowers usually four-cleft, with four floral leaves. Stem creeping, with hairy joints. Leaves obovate.—Native of Egypt, and the East Indies. A small trailing annual, with yellow flowers, flowering in the stove in autumn.

4. *P. Halimoides*. Downy-headed Purslane. Linn. Sp. Pl. 639. Willd. n. 4. (*P. erecta*, *fedi minoris facie*, *capitula tomentosa*; Sloane Jam. v. 1. 205. t. 129. f. 3.)—Leaves oblong. Stem corymbose, erect. Flowers sessile, in terminal hairy heads.—Native of dry meadows in Jamaica, coming up after the wet season. This is a small bushy annual herb, unknown in our gardens.

5. *P. meridiana*. Noonday Purslane. Linn. Suppl. 248. Willd. n. 5. Ait. n. 5.—Leaves elliptical, flat. Stem creeping, with hairy joints. Flowers solitary, sessile, terminal.—Native of the East Indies. Linnæus had it in the Upsal garden, and it was introduced at Kew by sir J. Banks in 1791. This is also a small bushy herb, but creeping, not erect. Leaves opposite, sometimes quaternate. Flowers yellow, encompassed with wool. Their stamens are few, varying from four to eight. The younger Linnæus well observes that this plant has no pretensions to form a new genus, though his illustrious father had thought otherwise.

PORTULACA, in Gardening, contains plants of the herbaceous and shrubby kinds, of which the species cultivated are, the garden purslane (*P. oleracea*); and the round-leaved purslane (*P. anacampseros*.)

There are several varieties of the first. The garden purslane differs from the wild, only in having larger and more succulent leaves. If it be permitted to scatter the seeds, in two years it will become in every respect like the wild plant. Of the two other varieties, one is with deep-green leaves, and the other with yellow leaves, which is called golden purslane.

Method of Culture.—These plants may be increased by seeds and cuttings, according to the different kinds.

In the first sort the seeds should be sown in slight-drills, or broad-cast over the surface, at different times, in the spring and summer, from March to June, or later, at the distance of three weeks, the early sowing being made on slight hot-beds, but the late ones in the open borders, where the ground is light and dry, occasional light waterings being given afterwards, both before and after the plants appear, which must remain where they come up, and are mostly fit for cutting in the course of a month or five weeks. In gathering them, the young tops should be cut off with a knife, and they afterwards shoot out fresh tops.

In the second sort the cuttings should be planted in pots filled with light dry mould, and plunged in the tan-bed, in order to promote their rooting, moderate shade and waterings being given till they have stricken good root, being kept in the stove, and afterwards managed as the succulent kinds of aloes.

The last affords variety among other stove potted plants.

PORTULACARIA, in Botany, a genus founded by Jacquin in his *Collectanea*, v. 1. 160, and adopted by Schreber, Gen. 203, as well as by Willdenow and Aiton. It consists of the Linnæan *Claytonia Portulacaria*, and the character is as follows.

Calyx of two leaves. Petals five. Seed one, with three wings.

This is an African shrub, named *P. afra*, and figured in Decand. Pl. Grasses, t. 132, as well as in Dill. Hort. Elth. t. 101. f. 120.—How good soever the genus may be, the name is bad, and inadmissible.

PORTULACARIA, in Gardening, furnishes a shrubby plant of the succulent green-house kind, of which the species cultivated is the African purslane (*P. afra*).

Method of Culture.—It is readily increased by cuttings of the stems or branches, planted during any of the summer months, having been laid to dry for some days before, in pots filled with sandy earth, being placed in a frame, and shaded in hot weather, and protected from wet. They are also much forwarded by being plunged in the bark-bed of the stove. It must be placed in a warm glass case in winter, where it may enjoy the full sun, and should have very little water during that season. In summer the plants should be placed abroad in a sheltered situation, and in warm weather be refreshed with water twice a week; but the stalks being very succulent, too much wet is always hurtful.

These afford variety among other green-house plants.

PORTULACASTRUM, in Botany. See TRIANTHEMA.

PORTULACEÆ, a natural order of Jussieu, the fourth of his 14th class, and named from the first and best-known genus among those of which it is composed. See FICOIDEÆ, MELASTOMÆ, MYRTI, for other orders of this class.

The characters of *Portulacææ* are as follows. Calyx inferior, divided at the top. Corolla of a determinate number of petals, rarely of one petal, or wanting, inserted into the middle or base of the calyx, and when its divisions are equal to those of that part, they are disposed alternately therewith. Stamens inserted into the same part, definite, rarely indefinite, in number. Germen superior, simple. Styles one, two, or three, rarely wanting. Stigmas often several. Capsule of one cell or many, each cell with one or many seeds. Corculum incurved, surrounded by a farinaceous or fleshy mass. Herbs or shrubs, rarely small trees, of a succulent habit. Leaves opposite or alternate, often succulent.

Section 1. Fruit of one cell.

This comprehends *Portulaca*; *Talinum*; *Turnera*; *Bacopa* of Aublet; *Montia*; *Rokejeka* of Forskall; *Tamarix*; *Telephium*; *Corrigiola*; *Scleranthus*; and Forskall's *Gymnocarpus*.

Section 2. Fruit of many cells.

Triantema; *Limeum*; *Claytonia*; and *Gisckia*.

PORTUMNA, in Geography, a post-town of the county of Galway, Ireland. It is situated on the river Shannon, where it falls into lough Deirgeart, and had formerly a wooden bridge over it, but this having been broken down in time of war, was not rebuilt, and at present there is only a ferry. Portumna has some ruins, especially of a monastery, and a castle belonging to the marquis of Clanricarde. It is 76 miles W. by S. from Dublin.

PORTUMNALIA, among the Romans, a festival in honour of Portumnus, who was supposed to preside over ports and havens, celebrated on the seventeenth of August.

PORTUS, QUINQUE. See QUINQUE *Portus*, and CINQUE *Ports*.

PORTUS, in Ancient Geography, a town of Italy, at the mouth of the Tiber, 126 stadia from Rome.

PORTUS Augusti, or *Portus Romanus*, *Porto*, a port of Italy, at the right mouth of the Tiber. The first port which the Romans had at the mouth of this river was that of Ostia, constructed by Ancus Martius. Claudius built another with an immense basin. Two extensive moles formed a secure haven. Between the old and the new port two arms of the Tiber formed an island, called "Infula sacra." No trace now remains of these ports.

PORTUS Magnus, a port on the southern coast of the isle of Albion, between the mouth of the river Alaunius and that of Trifanton. Ptolemy.

PORTUS, FRANCIS, in *Biography*, born at Candia in 1511, was brought up at the court of Renée of France, wife to the duke of Ferrara, in which city he taught the Greek language. He imbibed the principles of the reformed religion, and when Renée, after the duke's death, returned to France, he went to Geneva, in 1561, in order that he might worship, undisturbed, his maker according to the dictates of his conscience. He was there presented with the privilege of citizenship, and made professor of Greek, an office which he held till his death, in 1581. He published commentaries and annotations upon Pindar, Sophocles, some of the works of Xenophon, Thucydides, Aristotle's Rhetoric, Longinus, and some other writers, a Latin version of the Psalms, and the Hymns of Synesius, an improved edition of Constantine's Greek Lexicon, a reply to Charpentier's defence of the bloody massacre of St. Bartholomew, and other pieces. He had a son, Æmilius, born in 1551, who pursued a similar course of study, and was successively regent of the second and first classes at Geneva, Greek professor at Lausanne in 1581, and at Heidelberg in 1592. He published editions, with commentaries, notes, &c. of various ancient authors, as Aristophanes, Dionysius Halicarnensis, Suidas, notes on Thucydides and Euripides, also dictionaries of the Doric and Ionic dialects.

PORVEAR, in *Geography*, a town of Hindoostan, on the coast of Malabar; 18 miles W. of Travancore.

PORUR, a town of Hindoostan, in the circar of Kerleh; 32 miles N.W. of Maltoy.

PORUS OPTICUS, in *Anatomy*, the opening in the centre of the optic nerve, through which the arteria centralis oculi enters the eye. See **EYE**.

PORUS, in *Natural History*, a name given by authors to a peculiar kind of fossil coral, of which there are many different species: these are all of a beautifully laminated structure, and seem allied to the mycetizæ or fungitæ; they are seldom found loose, but usually bedded in hard marble, and with their pores filled up with sparry or mineral matter.

PORUS is also the name of the *tophus*; which see.

PORUS Cervinus, a name given by authors to a species of marine substance, found among the rocks in the coral fisheries, and in other places. It grows at different depths, and seems to adhere to the rocks by a simple base, having no root, nor any thing in the place of one. It is branched in such a manner, that with the help of a little imagination, it has been forced into the resemblance of a stag's horn; its height is about an inch and a half, often less when newly taken out of the sea; and is of a fine snow-white colour; but when it has lain some time to dry, it becomes of a dusky yellow; it is very thin, perfectly transparent, and seems composed of several fine membranes. When examined by the microscope, an admirable structure is discovered in it; the whole being composed of a membranous matter, in which is an infinite number of holes, and all these arranged into regular lines.

Count Marfigli has distinguished this, which is the common kind of porus cervinus, or buck's-horn porus, by the name of *minor*, in order to prevent its being confounded with another less common kind, which Ferrante Imperato has described under the name of *porus cervinus*, and which is a species of *fuflra* (the *fuflra-foliacea*), and broad-leaved hornwrack of Ellis.

This larger kind is also found growing on the rocks in the coral fisheries; but it always is found at great depths, never near the surface, as the other often is. It grows to the rock by a small base, and from thence rises to a short trunk, which spreads itself out into several flat branches, divided every where into two, as those of most of the sea-

fuces are; and these are so expanded as to form, what people imagine, a resemblance of a stag's horn. This grows to a little more than two inches in height, and is of a beautiful pale yellow, or straw colour, even while growing, and looks glossy and shining, as if covered with a thin coat of varnish. It is as thin as the finest paper; and when viewed by the microscope, is found to be of a particular texture. It is sometimes found growing to the shells of sea-fishes; but of those only which live in great depths of water. Count Marfigli has given elegant figures both of this and the smaller kind, not only in their natural state, but as they appear to the microscope.

PORUS Cervinus is also a species of *fasciola*, in the class of *Vermes Intestina*.

PORZANA, in *Ornithology*, the spotted gallinule of Pennant and Latham, a species of *rallus*; which see.

PORZANO, in *Geography*, a town of Italy, in the department of the Mela; 10 miles S. of Brescia.

POSADAS, a town of Spain, in the province of Cordova, on the Guadalquivir; 17 miles S.W. of Cordova.

POSATA, a town on the E. coast of Sardinia; 45 miles E.S.E. of Castello Aragonese.

POSCA, the name of a mixture of vinegar and water, which was the common drink of the Roman soldiers.

POSCENIUM, or **POSTCENIUM**, among the Romans, the back part of the theatre, where the actors retired to undress themselves. Danet. in voc.

POSCENIUM was sometimes used to signify a lady's dressing-room, where the paint and washes were kept and used, and where men were not allowed admittance. See **PARASCENIUM**.

POSCHECHONE, in *Geography*, a town of Russia, in the government of Jaroslavl; 44 miles N.N.W. of Jaroslavl. N. lat. 58° 12'. E. long. 39° 14'.

POSCOSA, a town of the county of Tyrol; 9 miles S.E. of Trent.

POSE', in *Heraldry*, denotes a lion, horse, or other beast, standing still, with all four feet on the ground; to denote thereby that it is not a moving posture.

POSEGA, or **POSZEGA**, in *Geography*, a town of Sclavonia, and capital of a county of the same name; 19 miles N.E. of Gradisca. N. lat. 45° 35'. E. long. 17° 48'.

POSEN, or **POSNA**, a handsome, but not very large, town of the duchy of Warsaw, late capital of a palatinate in Great Poland, situated on the Warta, and inclosed with a double wall and deep moat; having on the other side of the Warta two suburbs, viz. Szrodka and Waliszewo, which are surrounded with a large morass. The town and suburbs are subject to the frequent inundations of the river. The castle stands on an island in the Warta. The town contains several churches and convents, and is the see of a bishop, whose palace, situated near the cathedral, is a fine structure. This is the first in rank, and the most ancient episcopal see in Poland. This city is indebted for a great part of its prosperity to its trade with Germany. It is a staple town, having a court of judicature, and many privileges. This palatinate belonged to the king of Prussia, being annexed to his dominions in 1773; but by the treaty of Tilsit in 1807, it was given to the king of Saxony; 145 miles W.N.W. of Warsaw. N. lat. 52° 22'. E. long. 17°.

POSEN, a town of Prussia, in Bartenland; 9 miles S.S.E. of Rastenburg.

POSERITZ, a town of Anterior Pomerania; 11 miles S.W. of Bergen.

POSIDEIUM, in *Ancient Geography*, a town built by Amphilocus, son of Amphiaræus, upon the frontiers of Cilicia and Syria, over-against the isle of Cyprus.

The Greeks gave a similar appellation to several places and promontories, in reference to Neptune, ποσειδων, *posidon*, who had a temple in them, appropriated to his honour.

POSIDIA, Ποσιδια, in *Antiquity*, a festival in honour of Neptune, called Ποσειδων.

POSIDIUM, Ποσειδειον, in *Chronology*, the seventh month of the Athenian year. It consisted of thirty days, and answered to the latter part of our December, and the beginning of January.

It had this name from the festival Posidonia celebrated in it.

POSIDONIA, Ποσιδωνια, in *Antiquity*, the same with *posidia*.

POSIDONIA, in *Ancient Geography*. See PÆSTUM.

POSIDONIUS, in *Biography*, an astronomer and mathematician of Alexandria, was the disciple of Zeno of Citticus, and was a contemporary with, or lived soon after, Eratosthenes. He probably flourished about the year 260 B.C. He is particularly celebrated on account of his having employed himself in endeavouring to ascertain the measure of the periphery of the earth, by means of the altitude of a fixed star. He, according to Cleomedes, concluded that it was 240,000 stadia; but according to Strabo, he made it 180,000 stadia only. He is the reputed author of a treatise on military tactics, which is mentioned by Ælian in the first chapter of his work on the same subject. No fragments of his writings are extant.

POSIDONIUS, a celebrated Grecian philosopher of the Stoic sect, who flourished about 50 or 60 years before Christ, was a native of Apamea, in Syria. He taught philosophy at Rhodes with so much reputation, that Pompey, on his return towards Rome, after the successful termination of the war against Mithridates, came thither with the design of attending his lectures. "When he came to the house," says the historian, "he forbade his licitor to knock at the door, but, by ordering him to lower the fasces at the gate of Posidonius, this mighty conqueror of the eastern and western world paid a respectful homage to philosophy. Posidonius being confined with a severe attack of the gout, Pompey visited him in his chamber, and expressed his regret that the philosopher's situation would deprive him of the pleasure of hearing his discourses. Upon this Posidonius made an effort for the gratification of his illustrious visitor, and delivered a discourse, to prove that nothing could be deemed good that was not honourable. He studied astronomy as well as morals, and constructed a kind of sphere, with which he exhibited the apparent motions of the sun, moon, and planets round the earth. Cicero says that he himself attended the lectures of this philosopher, and it is asserted, upon the authority of Suidas, that he was brought to Rome by Marcellus, in the 702d year from the building of the city, which was the 52d year B.C. He is thought to have written a continuation of the history of Polybius in a polished and elegant style. There were two other distinguished ancients of the name of Posidonius; one an architect and engineer, who attended the armies in the latter capacity. He is said to have been the inventor of a moveable tower, contrived for approaching the walls of a besieged place. The other was a native of Olbiopolis, and an historian as well as natural philosopher. The time when he flourished is not known. He was author of the history of Attica, in four books; a history of Africa, in eleven books; an account of the Tyrian territory; and a treatise on the ocean and its productions.

POSILIC, in *Geography*, a town of Prussia, in Pomeralia; 8 miles E. of Marienburg.

POSINARA, in *Ancient Geography*, a town of India, near the Ganges, but beyond it, near Pandaa.

POSING, in *Geography*, a town of Hungary; 11 miles N.N.E. of Presburg.

POSQUIT, in *Ornithology*, a name given by the people of the Philippine islands to a small bird very common among them, and approaching to the nature of the canary bird, but smaller, and wanting its harmonious voice.

POSITI, among the Romans, an appellation given to the dead when placed at the door with their feet outwards, till the time of their interment.

POSITION, in *Physics*, *site*, or *situation*; an affection of place, which expresses the manner of any body's being therein.

POSITION, in *Architecture*, denotes the situation of a building, with regard to the points of the horizon.

Vitruvius directs the position of a building to be such as that the four corners point directly to the four winds.

POSITION, in *Astronomy*. The position of the sphere is either right, parallel, or oblique; whence arise the inequality of our days, difference of seasons, &c. See SPHERE.

POSITION, *Circles of*. See CIRCLES.

POSITION, in *Dancing*, the manner of disposing the feet with regard to each other.

There are four regular positions: the first is, when the feet are joined in a line parallel to the shoulders: the second, when the heels are perpendicularly under the shoulders; and of consequence the width of the shoulders apart: the third, when one foot is before the other, in such a manner, as that the heel is in the cavity formed by the rotula and carpus of the foot: the fourth, when one foot is the width of the shoulders apart from the other, the heel still answering to the cavity above-mentioned, which is the only regular manner of walking.

POSITION, in *Arithmetic*, a rule so called, for *supposition*.

The rule of *false position* consists in calculating on several false numbers, taken at random, as if they were the true ones; and, from the differences found in them, determining the number sought.

Position is either *single* or *double*.

POSITION, *Single*, is when there happens in the proposition some partition of numbers into parts proportional; in which case, the question may be resolved, at one operation, by this rule: imagine a number at pleasure, and work with it, according to the tenor of the question, as if it were the true number: and what proportion there is between the false conclusion and the false position, such proportion the given number has to the number sought.

Therefore, the number found by argumentation shall be the first term of the rule of three; the number supposed the second term; and the given number, the third.

E. gr. A school-master being asked how many scholars he had, replied, if he had as many more, half as many, and one-fourth as many, he would have but one less than 100; how many had he? Suppose the number 20: then $20 + 20 + 10 + 5 = 55$ instead of 99; therefore $55 : 20 :: 99 :$
 $\frac{99 \times 20}{55} = 36$, the number required.

POSITION, *Double*, is when there can be no partition in the numbers to make a proportion.

In this case, therefore, you must make a supposition twice; proceeding therein according to the tenor of the question.

If neither of the supposed numbers solve the proposition, observe the errors, and whether they be greater or less than the

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the resolution requires, and mark the errors accordingly, with the signs + and -.

Multiply, contrariwise, the one position by the other error; and if the errors be both too great, or both too little, subtract the one product from the other, and divide the difference of the products by the difference of the errors.

If the errors be unlike, as the one +, and the other -, add the products, and divide the sum thereof by the sum of the errors added together. For the proportion of the errors is the same with the proportion of the excesses or defects of the numbers supposed, to the numbers sought.

Having found the errors, say, as the sum of the errors, when they are of different kinds, or, as the difference of the errors, when they are of the same kind, is to the difference of the suppositions, so is the least error to the correction of the supposition belonging to this error; which must be added to or subtracted from it according to the following conditions; viz. if the errors be of the same kind, add the correction to this supposition if it is greater than the other supposition, and subtract when it is the less; but if the errors be of different kinds, do the contrary, viz. add when that supposition is the less, and subtract when it is the greater of the two: and the sum or difference will be the number sought.

E. gr. 1. If 100*l.* be divided between A, B, and C, in such a manner, that B had three times as much as A, and C as much as A and B together, and their respective sums be required. Suppose, first, A's = 12, B's will be = 36, and C's = 48, the sum of which will be 96 instead of 100, and leave an error in defect, or - 4.

Suppose, 2dly, A's = 14, then B's = 42, and C's = 56, and the sum = 112 instead of 100; hence we shall have an error in excess, or + 12. And $4 \times 14 = 56$, and $12 \times 12 = 144$, and $144 + 56 = 200$: and $\frac{200}{16} = 12\frac{1}{2}$ for A's real share.

E. gr. 2. A party of soldiers marching, came up with a shepherd, and drove off half his flock and half a sheep; another party carried off half the remainder and half a sheep; and a third plundered him of half the remainder and half a sheep, and after all he had twenty sheep left: what was the number of the whole flock?

1st. Suppose it 21: of which the first party took $\frac{21}{2} + \frac{1}{2} = 11$, the second took $\frac{10}{2} + \frac{1}{2} = 5\frac{1}{2}$, the third took $\frac{4\frac{1}{2}}{2} + \frac{1}{2} = 2\frac{3}{4}$; so that the remainder was $1\frac{3}{4}$ instead of 20, which gives an error in defect, or - $18\frac{1}{4}$.

2dly. Suppose the number 23: then $\frac{23}{2} + \frac{1}{2} = 12$; $\frac{11}{2} + \frac{1}{2} = 6$; $\frac{5}{2} + \frac{1}{2} = 3$; and the remainder will be 2 instead of 20, and leave an error in defect, or - 18. Then $18 \times 21 = 378$, and $18\frac{1}{4} \times 23 = 419\frac{3}{4}$; and $419\frac{3}{4} - 378 = 41\frac{3}{4}$, which divided by $\frac{1}{4}$, gives a quotient 167 for the true number.

To the rule of position belong such questions, in which the required number or numbers do not ascend above the first power; such, *e. gr.* as most of the questions usually brought to exercise the reduction of simple equations in algebra. But it will not bring out true answers, when the numbers sought ascend above the first power; for then the results are not proportional to their positions, nor the errors to the difference of the true number and each position: yet

in all such cases it is a very good approximation; and in exponential equations, as well as many other things, succeeds better than perhaps any other method.

The above rule of position is found in the earliest writers on arithmetic, and has been retained by nearly all modern authors; though as an arithmetical rule, it is not only useless, but has a tendency to lead to error; there being only a few questions to which it will apply, and these it is difficult to distinguish from those, in which it will not give a correct answer, without an investigation, which is more than sufficient to obtain the correct result. It is, therefore, to be regretted that this, as well as some other useless or superfluous rules, are not expunged by modern authors on arithmetic, to make room for some others, which are as improperly omitted.

The only case in which the rule of position can be advantageously employed, is in the approximation to the roots of numerical and exponential equations; and here, particularly in respect of the latter, it sometimes furnishes a method of solution, which it would be difficult to obtain upon any other principle. When, therefore, we state the rule to be useless in arithmetic, it must not be understood that we wish it to be totally laid aside, but to be transferred from books of arithmetic to those of algebra, to the latter of which sciences it more particularly belongs.

The simplest form of the rule for the latter purpose is as follows:

Find, by trial, or otherwise, two numbers as near the true root as possible, and substitute them in the given equation, instead of the unknown quantity; noting the results that are obtained from each.

Then, as the difference of these results is to the difference of the two assumed numbers, so is the difference between the true result and either of the former to the correction of the number belonging to the result used; which correction, being added to that number when too little, or subtracted from it when too great, will give an approximate value of the root sought.

Again: using the root thus obtained as a new supposition, and another number either in excess or defect, as the case may require, another approximation may be obtained, and so on to any degree of accuracy at pleasure.

There is here, as in all other methods of approximation, except Lagrange's, this defect, that we never can tell the exact degree of approximation obtained. However, in most cases, we may depend upon doubling the number of figures each operation; that is, if we begin with one figure, we may obtain two; and using these two, we may find four; and these four will give eight, and so on.

Let us illustrate this by an example.

Given $x^3 + x^2 + x = 100$, to find an approximate value of x .

Here it is found by a few trials, that the value of x lies between 4 and 5; whence assuming these numbers, the first operation will stand as follows:

4	=	x	=	5
16	=	x^2	=	25
64	=	x^3	=	125
—				—
84	results			155
—				—

Hence the difference of the results is 71, of the suppositions 1; and the difference between the least result (84) and the given number (100) is 16: whence by the rule;

As $71 : 1 :: 16 : 2$, the correction; so that the first approximation gives $x = 4.2$.

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Assume now $x = 4.2$, and 4.3 , and we have as before :

$$\begin{array}{rcl} 4.2 & = & x = 4.3 \\ 17.64 & = & x^2 = 18.49 \\ 74.088 & = & x^3 = 79.507 \end{array}$$

$$\begin{array}{rcl} 95.928 & \text{results} & 109.297 \end{array}$$

$$\therefore \left\{ \begin{array}{l} 102.297 \\ 95.928 \end{array} \right. \begin{array}{l} 4.3 \\ 4.2 \end{array} \begin{array}{l} 100 \\ 95.928 \end{array}$$

$$\text{As } 6.369 : .1 :: 4.072 : .64$$

Therefore $x = 4.2 + .064 = 4.264$ nearly.

Assume again $x = 4.264$, and 4.265 , and the operation gives the following result :

$$\begin{array}{rcl} 4.264 & = & x = 4.265 \\ 18.1817 & = & x^2 = 18.1902 \\ 77.5267 & = & x^3 = 77.5813 \end{array}$$

$$\begin{array}{rcl} 99.9724 & \text{results} & 100.0365 \end{array}$$

$$\therefore \left\{ \begin{array}{l} 100.0365 \\ 99.9724 \end{array} \right. \begin{array}{l} 4.265 \\ 4.264 \end{array} \begin{array}{l} 100 \\ 99.9724 \end{array}$$

$$.0641 : .001 :: .0276 : .0004299$$

Therefore $x = 4.264 + .0004299 = 4.2644299$ nearly.

In an example of this kind, however, very little, if any, advantage is gained by the rule of position; the solution being obtained with equal ease, and to the same degree of accuracy, by Newton's, or rather Raphson's well-known method of approximation; but in more complicated cases, this rule ought to be preferred. Thus, in such an example as the following, the rule of position is particularly applicable.

Given $(\frac{1}{2}x^2 - 15)^2 + x\sqrt{x} = 90$, to find an approximate value of x .

Here, by a few trials, it is found that the value of x lies between 10 and 11, which, therefore, let be the two assumed numbers, and the operation will stand as follows :

$$\begin{array}{rcl} 10 & = & x = 11 \\ 25 & = & (\frac{1}{2}x^2 - 15)^2 = 84.64 \\ 31.622 & = & x\sqrt{x} = 36.482 \end{array}$$

$$\begin{array}{rcl} 56.622 & \text{results} & 121.122 \end{array}$$

$$\therefore \left\{ \begin{array}{l} 121.122 \\ 56.622 \end{array} \right. \begin{array}{l} 11 \\ 10 \end{array} \begin{array}{l} 121.122 \\ 90 \end{array}$$

$$64.5 : 1 :: 31.122 : .4$$

Therefore the correction is .4, belonging to the greatest supposition; whence $x = 11 - .4 = 10.6$.

Assume now $x = 10.6$, and 10.5 ; then,

$$\begin{array}{rcl} 49.7025 & = & (\frac{1}{2}x^2 - 15)^2 = 55.830784 \\ 34.0239 & = & x\sqrt{x} = 34.511099 \end{array}$$

$$\begin{array}{rcl} 83.7264 & & 90.341883 \end{array}$$

$$\therefore \left\{ \begin{array}{l} 90.341883 \\ 83.7264 \end{array} \right. \begin{array}{l} 10.6 \\ 10.5 \end{array} \begin{array}{l} 90.341883 \\ 90 \end{array}$$

$$6.614683 : .1 :: .341883 : .005168$$

Whence $x = 10.6 - .005168 = 10.594832$ nearly.

We will add one other example of an exponential equation, for the solution of which no other method can be so advantageously applied as that of position.

Let it be proposed to find the value of x , in the exponential equation $x^x = 100$.

For more easily resolving such kind of equations as this, it is more convenient to take the logarithms of them, and

compute the terms by means of a table of logarithms: thus the logarithms of the two sides of the present equation are,

$$x \times \log. x = \log. 100 = 2.$$

Assuming; therefore, this as the proposed equation, it is found, by a few trials, that the value of x is between the numbers 3 and 4, and a farther trial shews it to be between 3.5 and 3.6; therefore taking these for the two suppositions, the work will stand as follows :

$$\begin{array}{rcl} 3.5 & = & x = 3.6 \\ 0.544068 & = & \log. x = 0.556303 \\ \times 35 & & \times 3.6 \end{array}$$

$$\begin{array}{rcl} 1.904238 & \text{results} & 2.002689 \end{array}$$

$$\therefore \left\{ \begin{array}{l} 2.002689 \\ 1.904238 \end{array} \right. \begin{array}{l} 3.6 \\ 3.5 \end{array} \begin{array}{l} 2.000000 = \log. \text{ of } 100 \\ 1.904238 \end{array}$$

$$.098451 : .1 :: .095762 : .09727$$

Whence $x = 3.5 + .09727 = 3.59727$ nearly.

Again: assume $x = 3.59727$, and 3.59728 ; then,

$$\begin{array}{rcl} 0.555973 & = & \log. x = 0.555974 \\ \times 3.59727 & & \times 3.59728 \end{array}$$

$$\begin{array}{rcl} 1.9999854 & \text{results} & 1.9999953 \end{array}$$

$$\therefore \left\{ \begin{array}{l} 1.9999953 \\ 1.9999854 \end{array} \right. \begin{array}{l} 3.59728 \\ 3.59727 \end{array} \begin{array}{l} 2.0000000 \\ 1.9999953 \end{array}$$

$$.0000099 : .00001 :: .0000047 : .0000474747$$

Whence the value of x is $3.59728 + .00000474747 = 3.59728474747$, which is a degree of approximation scarcely obtainable by any other method. See Dr. Hutton's Course of Mathematics, vol. i. p. 253; and Bonnycastle's Algebra, vol. i. p. 174.

POSITION, in *Geometry*, is a term sometimes used in contradistinction to *magnitude*. Thus a line is said to be *given in position*, *positione data*, when its situation, bearing, or direction, with regard to some other line is given: on the contrary, a line is given in magnitude, when its length is given, but not its situation.

Sir Isaac Newton shews how to find a point, from which three lines, perpendicularly let fall to three other lines given in position, have any given ratio, &c.

POSITION, *Geometry of*, is a species of geometry first treated of by Carnot, in his work entitled "De la Correlation des Figures de Géométrie," and afterwards more fully in his "Géométrie de Position:" it seems, however, that some idea of such a system had been entertained both by Leibnitz and d'Alembert. There exists between the several parts of every geometrical figure, two kinds of relation or ratio, *viz.* the ratio of magnitude, and the ratio of position. The first are those which have place between the absolute value of the quantities, the other is that which expresses their relative situations; indicating whether such a point is above or below a given line, to the right or left of a certain plane, within or without a given circle, &c., which latter relations it is the object of the geometry of position to determine and exhibit. In order to this, some determinate figure is fixed upon, to which all others of the same kind are referred, and which is called the *primitive system*, while that compared with it is called the *transformed system*; and as long as the different parts of the transformed system have the same directions or positions with regard to each other, their correlation is said to be *direct*, but when they are different, *inverse*. These positions, in the analytical representation of geometrical figures, are commonly indicated by the signs

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signs prefixed to the letters or symbols representing these lines or quantities; and the geometry of position, at the same time that it gives an uncommon facility to the investigation of many very interesting researches, sets in a clear and indisputable light, all those apparent mysteries and anomalies connected with the introduction of the negative sign into analytical investigations. The peculiar nature of the subject, however, its definitions, and notation, are such, as to prevent our giving the reader such a description of it as would be at all intelligible, without occupying a greater space than can be allowed for this article; all we can do, therefore, is to give one or two of his propositions, which, if they do not explain the method adopted by this author in his researches, they will at least display his ingenuity, and excite the curiosity of the reader to obtain farther information on this subject, than is consistent with the nature of this work to afford him.

Prop.—Let it be required to trace a figure which shall

1.		AB	=	$\text{cof. } n$
2.		AC	=	$\text{cof. } m$
3.		BD	=	$\text{fin. } m$
4.		CD	=	$\text{fin. } n$
5.		BC	{	$= \text{fin. } (m + n)$
			{	$= \text{fin. } m \cdot \text{cof. } n + \text{fin. } n \cdot \text{cof. } m$
6.		AD	{	$= \text{cof. } (m - n)$
			{	$= \text{cof. } m \cdot \text{cof. } n + \text{fin. } m \cdot \text{fin. } n$
7.	$BF = BE - EC$		{	$= \text{fin. } (m - n)$
			{	$= \text{fin. } m \cdot \text{cof. } n - \text{fin. } n \cdot \text{cof. } m$
8.	$AH = AE - DE$		{	$= \text{cof. } (m + n)$
			{	$= \text{cof. } m \cdot \text{cof. } n - \text{fin. } m \cdot \text{cof. } n$
9.		BE	{	$= \frac{1}{2} \text{fin. } (m + n) + \frac{1}{2} \text{fin. } (m - n)$
			{	$= \text{fin. } m \cdot \text{cof. } n$
10.		CE	{	$= \frac{1}{2} \text{fin. } (m + n) - \frac{1}{2} \text{fin. } (m - n)$
			{	$= \text{fin. } n \cdot \text{cof. } m$
11.		AE	{	$= \frac{1}{2} \text{cof. } (m - n) + \frac{1}{2} \text{cof. } (m + n)$
			{	$= \text{cof. } m \cdot \text{cof. } n$
12.		DE	{	$= \frac{1}{2} \text{cof. } (m - n) - \frac{1}{2} \text{cof. } (m + n)$
			{	$= \text{fin. } m \cdot \text{fin. } n$
13.	$BC \cdot BF$		{	$= \text{fin. } (m + n) \cdot \text{fin. } (m - n)$
			{	$= \text{fin.}^2 m - \text{fin.}^2 n$
			{	$= \text{cof.}^2 n - \text{cof.}^2 m$
14.	$AD \cdot AH$		{	$= \text{cof. } (m - n) \cdot \text{cof. } (m + n)$
			{	$= \text{fin.}^2 m - \text{fin.}^2 n$
			{	$= \text{cof.}^2 n - \text{cof.}^2 m$
15.	$AB^2 + DC^2$		{	$= \text{fin.}^2 n + \text{cof.}^2 n$
			{	$= 1$
16.	$AC^2 + B^2$		{	$= \text{fin.}^2 m + \text{cof.}^2 n$
			{	$= 1$
17.	$AE^2 + BE^2 + CE^2 + DE^2$		{	$= 1$

The demonstration of these formulæ is contained in a few sentences, premising as lemmas the following well-known geometrical properties, *viz.*

1. When the diameter of a circle is 1, the chord which subtends any angle formed at the circumference of the circle, is equal to the sine of that angle to radius 1.

2. The rectangle of any two sides of a triangle, is equal to the rectangle of the perpendicular demitted upon the third side, and the diameter of the circumscribing circle: which perpendicular is, therefore, expressed by the rectangle of the sides, when the diameter of the circle is taken as unity.

3. The cosine of an angle is the same as the sine of the complement of that angle, and the sine of an angle is the same as the sine of the supplement of that angle. Therefore, in any quadrilateral inscribed in a circle, the sines of the opposite angles are equal to each other, and the sine or

represent the principal relations between the sines and cosines of two angles, the sines and cosines of their sum, and the sines and cosines of their difference. Let the two proposed angles be represented by m and n , each of which we will at first suppose to be such that their sum ($m + n$) is less than a right angle; suppose also m to be greater than n , and let π represent a quadrant of the circumference, or a right angle.

Construction.—Draw any right line AD (*Plate XI. Geometry, fig. 14.*), and at one extremity, as A , make the angle $BAD =$ the angle m , and on the other side of the same line the angle $CAD = n$. In AD assume any point E at pleasure, and through it draw BC perpendicular to AD ; then through the three points A, B, C , describe a circle, and for the greater simplicity, let its diameter be equal to 1. Draw the two right lines BD, CD , and make $EF = CE$, and $EH = DE$; then we shall have the following formulæ, which exhibit all the cases of the sines and cosines of the angles $m, n, m + n, m - n$, as required, *viz.*

cosine of any one of the angles, is the same as the cosine or sine of either of the adjacent angles.

Hence we draw immediately the following conclusions.

1. $AB = \text{fin. } (\pi - n) = \text{cof. } n$.
2. $AC = \text{fin. } (\pi - m) = \text{cof. } m$.
3. $BD = \text{fin. } m$.
4. $CD = \text{fin. } n$.

Also from lemma 2 above, $BE = \text{fin. } m \cdot \text{cof. } n$; $EC = \text{fin. } n \cdot \text{cof. } m$; $AE = \text{cof. } m \cdot \text{cof. } n$; $ED = \text{fin. } m \cdot \text{fin. } n$; therefore,

5. $BC = \text{fin. } (m + n) = \text{fin. } m \cdot \text{cof. } m + \text{fin. } n \cdot \text{cof. } m$.

6. $AD \begin{cases} = \text{cof. } (m - n) = \text{fin. } \pi - (m - n) \\ = \text{cof. } m \cdot \text{cof. } n + \text{fin. } m \cdot \text{fin. } n. \end{cases}$

Again, since $BF = \text{fin. } (m - n)$, and $BE = EC$, by construction we have

7. BF

$$7. \text{BF} = \sin. (m - n) = \sin. m \cdot \cos. n - \sin. n \cdot \cos. m.$$

And on the same principle,

$$8. \text{AH} \begin{cases} = \cos. (m + n) = \sin. \pi - (m + n) \\ = \cos. m \cdot \cos. n - \sin. m \cdot \sin. n. \end{cases}$$

As to the rest of the formulæ in the table, they are derived from the above by the usual operations; and, therefore, need not be repeated in this place. This method of exhibiting the several cases of the sines and cosines of angles, though of a novel kind, does not arise out of the peculiarities of this species of geometry; the object of which is now to generalize the results here found, these having been all obtained upon the supposition of the two angles being such, that their sum is less, or at least does not exceed a right angle. The author, therefore, after having laid down certain theorems, with regard to the correlation of these quantities, such that no quantity can change from direct correlation to inverse, or according to the usual expression, from positive to negative, or from negative to positive, without passing through 0 or ∞ . With some other rules of a similar kind, he proceeds to shew what change will take place in these formulæ, on the supposition of the different lines of the figure moving in directions parallel to themselves, till some of them have passed through nothing, or infinity; and hence deduces, in the most unexceptionable manner, all the general results for these cases: but, as we before observed, it is not easy to explain his method without too much extending the limits of this article, and the reader, therefore, who wishes to pursue this interesting subject, must consult the works above quoted, *viz.* Carnot, "De la Correlation des Figures de Géométrie," and "Géométrie de Position" of the same author; the former published in 1801, 8vo., and the latter in 1803, 4to.

POSITION, in *Grammar*. See QUANTITY.

POSITION is also used for a thesis or proposition maintained in the schools.

POSITION, *Traiterous*. See TRAYTOROUS.

POSITION, in *Music*, has various significations. In the old *modal* notation, the effect of position was a more difficult study than prolation. (See MODES, and MODAL Signs.) In modern music, the position of notes on the staff among the lines and spaces, ascertains their gravity or acuteness. In beating time, the position of the hand or foot up or down ascertains the parts of a bar; and in instruments with a neck, the French call *position*, what we call *shift*; as first shift, double shift, triple shift; first position, second, third, &c.

POSITIONAL LIBEL. See ARTICULATED *Libel*.

POSITIVE, a term of relation sometimes opposed to *negative*.

Thus we say, the commandments are some of them positive, others negative.

POSITIVE *Quantity*, in *Algebra*. See QUANTITIES.

POSITIVE is also used in opposition to *relative* or *arbitrary*. Thus we say, beauty is no positive thing, but depends on the different tastes of the people.

POSITIVE is also used in opposition to *natural*.

Thus we say, a thing is of positive right, meaning, it is founded on a law which depends absolutely on the authority of him who made it.

The prohibition of eating certain beasts, under the old law, was of positive right; the command to honour father and mother, of natural right.

POSITIVE *Degree*, in *Grammar*, is the adjective in its simple signification, without any comparison.

Or, positive degree, is that termination of an adjective,

which expresses its subject simply and absolutely, without comparing it with any other.

Thus, good, *bonus*, fair, *pulcher*, &c. are in the positive degree; better, fairer, &c. in the comparative.

POSITIVE *Institutions*, or *Precepts*, in *Theology*, are those which are not founded upon any reasons known to those to whom they are given, or discoverable by them, but which are observed merely because some superior has commanded them. Positive precepts may be plainly distinguished from *arbitrary* precepts, *i. e.* those which are founded upon the mere will of the commander, and for which he himself can see no reason. Accordingly positive institutions may be allowed, without just objection, in a religion of which God is the author; because there are various relations of things unknown to us, and beyond the discovery of our natural faculties; and it is possible these relations, unknown to us, but most clearly known to God, may render some things fit to be done by us, which we cannot perceive ourselves to be under any obligation to perform, previously to a divine order and appointment. In other instances there may be a general reason for appointing some test of our obedience, when there is no peculiar reason for preferring one to another. Humility, and consequently virtue, may be in some circumstances more effectually promoted, when we are required to obey commands founded on reasons unknown to us, than if these commands carried their own apparent reason along with them; and it may be with this view that God sees fit to conceal from us the foundation of the commands in question. Civil governors may make laws founded on reasons unknown to their subjects, and proper to be concealed from them. God, as our creator and constant benefactor, has a right to command us incomparably superior to that of any civil governor. Besides, circumstances of worship will appear more solemn, when considered as matters of divine institution, than merely as matters of human invention, and a greater solemnity may thus be added to the worship itself; by which means they may have a remoter tendency greatly to promote those several virtues, which such acts of religious worship are intended to subserve. Upon the whole we may conclude, that a religion, of which God is the author, may comprehend positive institutions. See Butler's *Analogy*, part ii. ch. 1. Foster against Tindal, p. 281—284. Browne against Tindal, p. 194.

POSITIVE *Theology*. See THEOLOGY.

POSITIVE, in *Music*, denotes the little organ usually behind, or at the foot of the organist, played with the same wind, and the same bellows, and consisting of the same number of pipes with the large one, though those much smaller, and in a certain proportion. See ORGAN.

In the organs of the Jesuits, the positive is in the grand body.

POSITIVE *Levity*. See LEVITY.

POSITIVE *Proof*, in *Law*. See EVIDENCE.

POSLANSKOI, in *Geography*, a town of Russia, in the government of Archangel, on the Mezen; 220 miles E.S.E. of Archangel.

POSNECK, a town of Saxony, in the principality of Altenburg; 9 miles N.N.E. of Saalfeld. N. lat. 50° 40'. E. long. 11° 39'.

POSON. See PRESBURG.

POSOQUERIA, in *Botany*, Aubl. Guian. t. 51. Juss. 201, is *Cyrtanthus* of Schreber.

POSOYSCIE, in *Geography*, a town of Lithuania, in the palatinate of Troki; 12 miles N.W. of Troki.

POSSE, a land measure in Switzerland, 1232 of which are equal to 10 English acres, and each equal to 3927 English square yards.

POSSE Comitatus, *Power of the County*, a phrase in law, signifying the aid and attendance of all knights, gentlemen, yeomen, labourers, servants, apprentices, villains, and other persons, above the age of fifteen years, within the county; because all above that age are bound to have harness, by the statute of Winchester: only women, ecclesiastical persons, and such as are decrepid and infirm, are excused.

All persons under the degree of a peer are bound to attend upon warning of the sheriff or justices, under pain of fine and imprisonment, to defend the country against the king's enemies when they come into the land, as well as for keeping the peace and pursuing felons.

It is also used where a riot is committed, a possession kept upon a forcible entry, or any force of rescue used, contrary to the command of the king's writ, or in opposition to the execution of justice. Stat. 2 Hen. IV. c. 8.

POSSECK, or **POTZEL**, in *Geography*, a town of Saxony, in the Vogtland; 6 miles E. of Oelsnitz.

POSSEGA, a town of European Turkey, in Servia; 24 miles N.N.W. of Jenibafar.

POSSESSIO FRATRIS, in *Law*, is where a man hath a son and a daughter by one woman or *venter*, and a son by another *venter*, and dies; if the first son enters and dies without issue, the daughter shall have the land as heir to her brother, although the second son by the second *venter* is heir to the father: but if the eldest son dies without issue, not having made an actual entry and seisin, the younger brother by the second wife, as heir to the father, shall enjoy the estate, and not the sister. 1 Inst. 11. 15.

POSSESSION, **POSSESSIO**, *quasi pedis positio*, an action by which we hold or occupy any thing, either *de jure* or *de facto*.

POSSESSION de Facto, is when there is an actual and effectual enjoyment of the thing. See **DE FACTO**.

POSSESSIO de Jure, is the title a man has to enjoy a thing, though it be sometimes usurped, and in the actual possession of another. See **TITLE**.

This right of possession is of two sorts: an *apparent* right of possession, which may be defeated by proving a better; and an *actual* right of possession, which will stand the test against all opponents. Thus if the disseisor, or other wrong doer, who having obtained the possession by either fraud or force, hath only a *bare* or *naked* possession, without any shadow of right, dies possessed of the land of which he so became seized by his own unlawful act, and the same descends to his heir; by the common law the heir hath obtained an *apparent* right, though the *actual* right of possession resides in the person disseised; and it shall not be lawful for the person disseised to divest this *apparent* right by mere entry, or other act of his own, but only by an action at law. (Litt. § 385.) For until the contrary be proved by legal demonstration, the law will presume the right to reside in the heir whose ancestor died seized, rather than in one who has no such presumptive evidence to urge in his own behalf. But if he who has the actual right of possession puts in his claim, and brings his action within a reasonable time, and can prove by what unlawful means the ancestor became seized, he will then by sentence of law recover that possession, to which he hath such actual right. Yet, if he omits to bring this his possessory action within a competent time, his adversary may imperceptibly gain an *actual* right of possession, in consequence of the other's negligence. And by this and certain other means, the party kept out of possession may have nothing left in him but the mere *right* of **PROPERTY** (which see), without either possession, or even the right of possession. Thus, if a disseisor turns me out of possession of my lands, he thereby gains a *mere naked* possession, and I still

retain the right of possession and right of property. If the disseisor dies, and the lands descend to his son, the son gains an *apparent* right of possession; but I still retain the *actual* right both of possession and property. If I acquiesce for thirty years, without bringing any action to recover possession of the lands, the son gains the actual right of possession, and I retain nothing but the mere right of possession. And even this right of property will fail, or at least it will be without a remedy, unless I pursue it within the space of sixty years. Blackst. Comm. book. ii.

POSSESSION, *Estates in*. See **ESTATE**.

POSSESSION, *Property in*. See **PROPERTY**.

POSSESSION, *Unity of*, makes what the civilians call *consolidation*; which see. See also **UNITY**.

By the French laws, a possession of three years, in matters personal, begets a right; and in real estates, a possession of ten years, among persons living near the premises, and twenty years among those that live elsewhere.

POSSESSION, *Writ of*. See **EJECTIONE Firme**.

POSSESSION, *Annual*, is the *usucaptio* (which see), which gives a right to moveables: a triennial and peaceable possession of a benefice is sufficient to maintain it, provided it be founded on a plausible title.

POSSESSION is sometimes also used for the act of taking possession, which is performed with certain formalities, by which a person is justified to be in the enjoyment of any thing.

Anciently, upon buying an estate, possession was taken with much ceremony; in some places, by a stick, a branch, or a straw, put into the hands of the buyer by the seller. See **INVESTITURE**.

POSSESSION of a Benefice, in some customs, is taken by entering the church, kneeling down, kissing the altar, and ringing the bell. See **INDUCTION**.

In some cases, possession is taken by the sight of the steeple.

POSSESSION is also used for the state of a person said to be possessed by the devil. See **DÆMONIAC** and **DÆMONIACAL Possession**.

POSSESSION, in *Mining*, is the right to a meer of ground, which the miners enjoy, by having stones upon that ground; and it is taken generally for the stones themselves, for the stones give possession.

POSSESSION, *La*, in *Geography*, a town of the island of Bourbon; 6 miles W. of St. Denys.

POSSESSION Bay, a bay in the straits of Magellan. The point of land at the entrance is situated in S. lat. 52° 23'. W. long. 68° 57'.

POSSESSION Island, an island in the South Pacific ocean, near the N. point of New Holland; where captain Cook hoisted English colours, and took possession of the whole E. and N.E. coast of New Holland, with its bays, &c. in the name of George III. king of Great Britain, by the name of New South Wales; 20 miles N. of York Cape. S. lat. 10° 33'. W. long. 218° 21'.

POSSESSION Sound, a bay in **ADMIRALTY Inlet**; which see. N. lat. 47° 52'. E. long. 237° 48'.

POSSESSIONEM, *Habere facias*, in *Law*. See **HABERE**.

POSSESSIVE PRONOUNS, in *Grammar*. See **PRONOUN**.

POSSESSO, a name given to one of the grandest processions at Rome, which is a ceremony that is performed by every pope, as soon as convenient after the conclave has declared in his favour. It is equivalent to the coronation in England, or the consecration at Rheims. On this occasion the pope goes to the Basilica of St. John Lateran, and, as

the phrase is, takes possession of it. This church, it is said, is the most ancient of all the churches in Rome, and the mother of all the churches in Christendom; and therefore, when the pope has got possession of this, he must be the real head of the Christian church, and Christ's vicegerent upon earth. From St. John Lateran's he proceeds to the Capitol, and receives the keys of that fortress; after which it is equally clear, that as an earthly prince he ought, like the ancient possessors of the Capitol, to have a supremacy over all kings. At the entrance of the Capitol he is met by the senator of Rome, who, falling on his knees, delivers the keys into the hand of his holiness, who pronounces a blessing over him, and returns him the keys. Proceeding from the Capitol, the pope is met by a deputation of Jews, soon after he has passed through the arch of Titus; and the chief rabbi presents him with a long scroll of parchment, on which is written the whole law of Moses in Hebrew. This procession is said to be the most showy and magnificent which takes place, on any occasion, in this city. Moore's View of Society, &c. in Italy, vol. i.

POSSESSORY ACTIONS, in *Law*, are those which serve only to regain that possession, of which the demandant, (that is, he who sues for the land,) or his ancestors have been unjustly deprived by the tenant or possessor of the freehold, or those under whom he claimed. These are the writs of *entry* and *assize*; which see.

POSSET, BEER. See ZYTHOGALA.

POSSEVINO, ANTONIO, in *Biography*, a Jesuit distinguished for learning and political abilities, was born in 1534 at Mantua. At an early age he went to Rome, where he was taken into the service of cardinal Hercules Gonzaga, who employed him in the education of his nephew Francesco, whom he accompanied to the universities of Ferrara and Padua. After the death of Francesco's father, the widow called her son, and with him his tutor Possentino, to Naples. The latter formed the design of entering into the society of the Jesuits, which he effected at Padua, in 1559. After he had passed his noviciate, he was sent by his superiors to the court of Emanuel Philibert, duke of Savoy, on affairs relative to the Catholic religion. From this period his life was spent in the continual exercise of his apostolical functions, and in transacting concerns entrusted to him by the court of Rome. In his missions he displayed the most active zeal in combating heresy, without any regard to the principles of moderation and humanity; and thus approved himself, according to the maxims of his order, a faithful and devoted servant to the interests of the holy see. He laboured to promote the reconciliation of Henry IV. with the Catholic church, by which he gave so much displeasure to the court of Spain, that he was ordered to quit Rome, where he then was. He retired to Ferrara, where he died in 1612, at the age of 78. Notwithstanding the many public affairs in which he was engaged, he wrote a number of books, which have given him a place among the most learned authors of that age. Of these the most considerable is entitled "Bibliotheca de Selecta Ratione Studiorum," in 2 vols. folio. This is an introduction to all the sciences, containing a summary of their principles, with an enumeration of the chief authors who treat of them. It is characterised by Dupin as displaying a great fund of erudition, and having much useful matter; but he adds, that it is overcharged with controversial pieces, and that the choice of authors is not always the best. Another important work is his "Apparatus Sacer," 2 vols. folio, which is a descriptive catalogue of writers in all the branches of theological science. His residence in Muscovy gave occasion to his composing a work, entitled "Muscovia,"

containing a detailed account of all that he had observed or learned relative to that country. He had a nephew, Antonio, who wrote in Latin a history of the Gonzagas, lords of Mantua, and of the war of Montferrat from 1612 to 1618.

POSSIBILITAS, POSSIBILITY, in our *Old Law Books*, is sometimes used for a thing done wilfully or wittingly.

In which sense it stands opposed to *impossibilitas*, a thing done against the will. "Si autem oculos asnaslet, reddat veram ejus, & impossibilitatis accusetur in eo facto." Leg. Alfred. Again: "Si quis agat impossibilitate, non est omnino simile ac si voluntarie faciat." Leg. Canut. cap. 6.

POSSIBILITY, in *Law*, is used in the same sense with contingency, or for that which may or may not happen. With respect to possibilities it is observed, that though they may be released, or devised by will, or may pass to the heir or executor, yet they cannot be assigned to a stranger, unless coupled with some present interest.

POSSIBILITY, Possibilitas, among the *Schoolmen*, denotes a non-repugnance to existing in a thing that does not any way exist. See **POSSIBLE**.

This non-repugnance to existing is no other than the producibility of any thing; which consists in this, that there are sufficient causes actually existing, or at least possible, whereby the thing may be produced, or be brought to exist; principally as there is a God, or an almighty cause.

So that possibility does not imply any thing in the thing possible, but it is a mere extrinsic denomination taken from the power of the cause, and principally of God.

In effect, if a creatable thing had any intrinsic possibility, it would follow, that such a thing must exist even without the cause.

And yet we may allow an intrinsic possibility of a thing, if by possibility we do not understand its producibility, or its non-repugnance to exist; but only the non-repugnance of the attributes contained in its idea. But such possibility is merely logical.

POSSIBLE, POSSIBLE, is sometimes opposed to real existence, and understood in the schools, of a thing, which, though it does not actually exist, yet may exist; as, a new star, another world, &c. which are particularly said to be *physically* possible.

It is also opposed to *impossible*. In which sense it is applicable to any thing that does not contradict itself, or involves contradictory predicates; whether it actually exist or not; as a man, fire, &c. These are also said to be *logically* possible.

It is a great point of controversy among the school-philosophers, whether and how far things may be said to have entity, while only in a state of possibility.

Possibles are ordinarily conceived to be threefold; *future*, *potential*, and *merely possible*.

POSSIBLE, Future, is that whose production is decreed and ascertained; *v. gr.* the futuration of all those events fixed by the immutable decree, or the immutable will, of the Almighty.

POSSIBLE, Potential, is that which is contained, or lies hid in its causes: as the tree in the seed, the fruit in the tree, &c.

POSSIBLE, Mere, is that which might exist, though it never shall.

Others distinguish possibles, into *metaphysical*, *physical*, and *ethical*.

POSSIBLE, Metaphysical, is that which may, at least, be brought

brought to being by some supernatural and divine power; as the resurrection of the dead.

In which sense the word is opposed to an impossible, even as it respects God himself; as a crooked straightness, a square circle, an infinitely perfect creature, a mortal God.

POSSIBLE, *Physical*, is that which may be effected by a natural power; in opposition to such things as cannot be produced by any finite power; as to restore the dead, &c.

POSSIBLE, *Ethical*, is that which may be done by prudent persons, using all the proper means they have for the same. Again, it is used for any thing done according to right reason, and consistently with the laws.

POSSIBILITY of *issue extinct*. See TAIL.

POSSIDONIA, in *Ancient Geography*. See PÆSTUM.

POSSINHO, in *Geography*, a town of Portugal, in Estramadura; 15 miles N.E. of Santarem.

POSSIRA, in *Botany*. See RITTERA.

POSSOMY, in *Geography*, a town of France, in the department of the Aveyron; 12 miles S.W. of Vabres.

POSSUM, in *Zoology*. See OPOSSUM.

POST, in the *Military Art*, is any spot of ground capable of lodging soldiers.

The word is formed from the Latin *positus*, *placed*; some derive it from *potestas*, *power*.

A post denotes any ground or place, fortified or not, where a body of men may make a stand, and fortify themselves, or remain in condition to fight an enemy.

A spot of ground seized by a party, to secure the front of an army, and to cover the posts that are behind, is called an *advanced post*.

The advance-guard, or the right of the two lines of an army, &c. is called the *post of honour*, and is always given to the eldest regiments.

A sentinel placed before the colours, and at the door of the commanding officer, is said to be in a post of honour.

POSTS, in *Building*, large pieces of timber, placed upright in houses, &c.

The corner posts are called the *principal* or *fencing* posts; the posts framed between the principal posts for strengthening the roof of a house, are called the *queen* posts.

An excellent method to preserve posts from rotting, is to burn the outside of the ends that are to be set in the ground to a coal.

POST, *Crown*. See CROWN *Post*.

POST also denotes the dispatch a courier or letter-carrier makes, by changing horses from time to time.

The name is borrowed hence, that the horses are *positi*, placed, posted, or disposed, from distance to distance.

The word is also applied to the person himself; the houses where he takes up, and lays down his charge; and the stages, or distances between house and house. Hence the phrases, *post-boy*, *post-horse*, *post-house*, &c.

We find mention made of post-horses in the Theodosian Code, *de cursu publico*; but these were very different from the present establishment, and were only public horses first appointed by Trajan; till whose time, the messengers seized any horses that came in their way.

Lewis Hornigk has an express treatise on posts, of which he makes four kinds; *viz.* on *horseback*, in *chariots*, in *boats*, and on *foot*: which last kind is in use in Italy, Turkey, and Peru: but in 1740, the Turks began to establish regular posts like those of Christian countries.

Herodotus ascribes the origin of posts to Cyrus, or Xerxes; but the posts instituted by those princes were no more than couriers.

In effect, posts on the present footing are but a mo-

dern invention; though some go back as high as Charlemagne.

It is certain it was the policy, or rather the diffidence of Louis XI. of France, which they owed their rise to; that uneasy prince first settled them by an ordonnance of the 19th of June, 1464, to be the sooner, and the more surely advertised of what passed in his own kingdom, and in the neighbouring states.

But these posts were only for the particular use of the court; for the author of the Life of the Duke d'Espernon says, that the packet or letter office was not set up in France anno 1619.

From France the institution propagated itself, by degrees, through the several other parts of Europe. In Germany, Hornigk observes, posts were first settled by the count de Taxis at his own expence; in acknowledgment of which, the emperor Matthias, in 1616, gave him, in chief, the charge of post-master under him and his successors.

In England, posts were first established by act of parliament 12 Car. II. anno 1660, which enabled the king to settle a post-office, and appoint a governor: though there had been posts in England from the time of Charles I. and probably somewhat earlier. For by 2 & 3 Edw. VI. c. 3. A.D. 1548, the rate of post-horses is fixed at one penny *per* mile. And in the twenty-sixth year of queen Elizabeth, anno 1581, we find mention of the office of chief post-master of England; and in 1631, of the office of post-master for foreign parts, which office we also learn from the *Fœdera*, tom. xix. fol. 385, had been first created by king James.

In earlier times the business of post-masters seems to have been confined to the furnishing of post-horses to persons who were desirous of travelling expeditiously, and to the dispatching of extraordinary packets upon special occasions. The post-office erected by James I., and placed under the controul of one Matthew de Quester, or de l'Equeter, served for the conveyance of letters to and from foreign parts; which office was afterwards claimed by lord Stanhope: but it was confirmed and continued to William Frizell and Thomas Witherings by king Charles I. A.D. 1632, for the better accommodation of the English merchants. (19 Rymer, *Fœd.* 385.) In 1635 the same prince erected a letter-office for England and Scotland, under the direction of the same Thomas Witherings, and settled certain rules of postage (Rym. 650. 20 Rym. 192.): but this extended only to a few of the principal roads, the times of carriage were uncertain, and the post-masters on each road were required to furnish the mail with horses at the rate of 2½*d.* a mile. Witherings was superseded for abuses in the execution of both his offices, in 1640; and they were sequestered into the hands of Philip Barlamachy, to be exercised under the care and oversight of the king's principal secretary of state. (20 Rym. 429.) On the breaking out of the civil war great confusion and interruption were necessarily occasioned in the conduct of the letter-office. And about that time the outline of the present more extended and regular plan seems to have been conceived by Mr. Edmond Prideaux, who was appointed attorney-general to the commonwealth after the murder of king Charles. He was chairman of a committee in 1642, for considering what rates should be set upon inland letters (*Com. Journ.* 28 Mar. 1642); and afterwards appointed post-master by an ordinance of both the houses (*ibid.* 7 Sept. 1644), in the execution of which office, he first established a *weekly* conveyance of letters into *all* parts of the nation (*ibid.* 21 Mar. 1649.); thereby saving to the public the charge of maintaining post-masters to the amount of 7000*l.* *per annum*. And, his own emoluments being probably

bably very considerable, the common council of London endeavoured to erect another post-office in opposition to his, till checked by a resolution of the house of commons (ibid. 21 Mar. 1649), declaring that the office of post-master is and ought to be in the sole power and disposal of parliament. This office was afterwards farmed by one Munday in 1654. (Scobell. 358.) And in 1657, a regular post-office was erected by the authority of the Protector and his parliament, upon nearly the same model as has been since adopted, and with the same rates of postage as continued till the reign of queen Anne. (Com. Journ. 9 June 1657. Scobell. 511.) After the Restoration, a similar office, with some improvements, was established by statute 12 Car. II. c. 35; but the rates of letters have been altered, and some farther regulations in the conduct of the post-office added, by 9 Anne c. 10. and several subsequent statutes, too numerous to be here recited.

The privilege of franking letters, claimed by members of parliament, was coeval with the establishment of the post-office in 1660. (See FRANK Letters.) The acts specifying the persons to whom the privilege of franking letters belongs, and the circumstances by which they are restricted and regulated, are the following: 4 Geo. III. c. 24. 24 Geo. III. c. 37. 26 Geo. III. c. 63. 35 Geo. III. c. 53. 42 Geo. III. c. 63. 43 Geo. III. c. 119. 44 Geo. III. c. 84. 46 Geo. III. c. 61. 48 Geo. III. c. 90.

At this time it appears, that the revenue of postage brought in 21,500*l.* whereas in 1653, the postage of England, Scotland, and Ireland, was farmed at 10,000*l.* yearly, By 15 Car. II. cap. 14. the revenue of the general post-office was settled on the duke of York and his heirs male: and by 1 Jac. II. c. 12. it was enacted by parliament, that this revenue, amounting at that time to 65,000*l.* *per annum*, should belong to the king and his successors; whence it was made a part of the king's private estate for ever, and not to be accounted for to parliament, as other public revenues are. In 1699, the net revenue of the post-office is said to have been 90,504*l.* 10*s.* 6*d.* By the tenth act of the ninth year of queen Anne, the former laws for establishing the post-offices in both kingdoms of England and Scotland were repealed; and one general post-office, and also one general post-master, was appointed for the united kingdoms: and by this act the postage of letters was increased by one-third: it appears also from this act, that the gross amount of the revenue for one year, ending at Michaelmas, 1710, was 111,461*l.* 17*s.* 10*d.*; and on a medium of three years, *viz.* 1708, 1709, 1710, the net income, according to Dr. Davenant, was 56,664*l.* 19*s.* 10½*d.*; but according to the report of the commissioners of the equivalent (anno 1718), to the house of commons, the medium then amounted to 62,000*l.* for England, and 2000*l.* for Scotland. On a medium of four years, *viz.* 1711, 1712, 1713, 1714, the net revenue was 90,223*l.* The net annual produce of the post-office at Michaelmas, 1722, was 98,010*l.* 8*s.* at which time the gross amount is stated to have been 201,804*l.* 1*s.* 8*d.*; the deduction for frank covers, 33,397*l.* 12*s.* 3*d.*; and the expence of management, 70,396*l.* 1*s.* 5*d.* In 1744, the gross amount of the inland and foreign offices was 235,492*l.* and in 1764, it was 432,048*l.* For the year ending 5th January 1813, the gross produce of the inland office for England, was 1,458,834*l.* 7*s.* 9*d.*; and of the foreign 95,797*l.* 15*s.* 4*d.*; for Scotland, 178,897*l.* 7*s.* 9*d.*; and for Ireland, 56,112*l.* 2*s.* 4*d.*

The English post-office is now managed by two post-masters general, with an annual salary of 5000*l.* a-year, who have under them many other officers of their own appointing. These are all sworn, and give security for their faithful discharge, &c., and are liable to the penalty of 20*l.*

and forfeiture of office, if they violate the duties specified in their oath; as the secretary and resident surveyor, assistant secretary, two chief clerks of the first and second branch, with subordinate senior and junior clerks and surveyors; receiver-general, with a salary of 800*l.* a-year; chief clerk, at 500*l.* a-year; and six subordinate clerks; accomptant-general, whose salary is 700*l.* a-year; his deputy, at 500*l.* a-year; and six clerks, surveyor, and superintendant of mail coaches, at 700*l.* a-year; two assistants, and three clerks; the inspector of the mis-sent and dead letters, with assistant and clerks; solicitor to the post-office; superintending president of the inland office, with three presidents and vice-presidents; six clerks of the roads; two senior clerks and assistants; twenty-one sorters; twenty-four junior sorters; four probationary sorters; four window-men; four inspectors of franks; three clerks to the superintending president; superintendant of letters, bill clerk, clerks, and messengers; and his deputy and assistants; one hundred and forty-four letter-carriers.

For bye and cross-road letters there are an accomptant, and three clerks: and for the foreign letter-office a comptroller with his deputy, six clerks, eight sorters, a messenger, inspector of letter-carriers, and twenty-four letter-carriers. There are also an inspector of ship-letters, with two clerks, and an inspector of packets, with a clerk. There are also agents for the packet-boats at Falmouth, Weymouth, Harwich, Holyhead, and Milford; besides agents and post-masters at several foreign ports.

On this grand office depend a great number of post-masters in England and Scotland, who keep regular offices in their several stages, and sub-post-masters in their branches.

A daily post is established (Sunday excepted) to and from this office, and most of the principal towns in England, and places in their respective districts.

For this purpose, Mr. Palmer's modern invention of mail-coaches has been found highly convenient and useful, not only for the safe and expeditious conveyance of letters, but also of passengers. Those who have travelled in these vehicles need not be informed of their rapid motion; and of the assiduity of the coachman, the guards, and the officers of the different post-towns, to expedite their progress. At 8 o'clock in the evening the mail-coaches depart from London, freighted with such letters and packets as have been conveyed in the course of the day either immediately to the general office in Lombard-street, or to the same place by means of the various receiving offices established in different parts of the town, whence they are transmitted by letter-carriers who perambulate various districts within the limited hour. And even after 7 o'clock, letters will be received for a trifling gratuity, when delivered before the several bags for the evening's post are made up. The coaches which proceed from London at 8 o'clock regulate their progress so as to arrive at the particular places to which they convey the mail at fixed hours; and those coaches that return to London with equal steadiness and celerity of motion arrive at the post-office in London at the early hour of six in the morning, so that the sorters have time to arrange the letters for the carriers, who wait to receive them, so as to allow of their completing their delivery soon after twelve at noon.

The general post-office in Scotland, at Edinburgh, is under the direction of a post-master-general, secretary, solicitor, accomptant, two surveyors, an inspector of dead and mis-sent letters, and three clerks of the English, Welsh, and North roads.

The general post-office of Ireland, at Dublin, is under the conduct of two post-masters general, a secretary, resident surveyor, accomptant-general, treasurer, and comptroller.

Letters to all parts of Europe are dispatched from London every Tuesday and Friday, except those to Portugal, which are forwarded by the Lisbon mails on Tuesday only. For this purpose, there are seven packet-boats at Dover, which sail every Wednesday and Saturday for Ostend and Calais; and five between Harwich and Helvoetsluys, which sail from Harwich every Wednesday and Saturday, and from Helvoetsluys on the same days: and five between Falmouth and Lisbon, which sail from Falmouth on Saturday, but the time of their sailing from Lisbon is uncertain. There are also several packet-boats between Falmouth and the Mediterranean, the West Indies, for which a mail is made up at London the first Wednesday in every month, and the packet sails from Falmouth on the Saturday following, and North and South America. The packet-boats on the Weymouth station, which are four in number, sail for Guernsey and Jersey every Wednesday and Saturday evenings. There are likewise seven packet-boats which sail daily between Holyhead and Dublin: and six between Milford and Waterford. See PACKET.

By 41 Geo. III. c. 7. the rates of postage are as follow: for every single letter, not exceeding 15 measured miles from the office where put in, to the office where delivered, 3*d.*; double letter, 6*d.*; treble, 9*d.*; an ounce, 1*s.*; and so in proportion for any greater weight. Above 15, and not exceeding 30 miles, a single letter, 4*d.*; double, 8*d.*; treble, 1*s.*; an ounce 1*s.* 4*d.*; and so in like proportion. Above 30, and not exceeding 50 miles, a single letter, 5*d.*; double, 10*d.*; treble, 1*s.* 3*d.*; an ounce, 1*s.* 8*d.*; and so in like proportion. Above 50, and not exceeding 80 miles, a single letter, 6*d.*; double, 1*s.*; treble, 1*s.* 6*d.*; an ounce, 2*s.* 6*d.*; and so in like proportion. Above 80, and not exceeding 120 miles, a single letter, 7*d.*; double, 1*s.* 2*d.*; treble, 1*s.* 9*d.*; an ounce, 2*s.* 4*d.*; and so in like proportion. Above 120, and not exceeding 180 miles, a single letter, 8*d.*; double, 1*s.* 4*d.*; treble, 2*s.*; an ounce, 2*s.* 8*d.*; and so in like proportion. Above 170, and not exceeding 230 miles, a single letter, 9*d.*; double, 1*s.* 6*d.*; treble, 2*s.* 3*d.*; an ounce, 3*s.*; and so in like proportion. Above 230, and not exceeding 300 miles, a single letter 10*d.*; double, 1*s.* 8*d.*; treble, 2*s.* 6*d.*; an ounce, 3*s.* 4*d.*; and so in like proportion. Where the distance above 300 miles is not 100 miles, for a single letter, 1*d.* more; double, 2*d.*; treble, 3*d.*; an ounce, 4*d.*; and so in proportion for every letter or package above an ounce. But where the distance above 300 miles is more than 100 miles, a further sum of, for every single letter, 1*d.*; double, 2*d.*; treble, 3*d.*; an ounce, 4*d.*; and so on progressively for every further distance of 100 miles, a like further sum for a single letter, 1*d.*; double, 2*d.*; treble, 3*d.*; an ounce, 4*d.*; and so in proportion. For all letters to and from Ireland, conveyed by packet-boats, shall be paid, above all other rates, for every single letter, 2*d.*; double, 4*d.*; treble, 6*d.*; an ounce, 8*d.*; and so in proportion for more than an ounce. By 45 G. III. c. 11. the following additional charges are payable: within Great Britain, and also from Great Britain to Ireland, for every single letter, 1*d.*; double, 2*d.*; treble, or other letter under an ounce, 3*d.*; an ounce in weight, and every packet not exceeding an ounce, 4*d.*; and so in proportion for every other letter or packet of greater weight than an ounce. Also, for the conveyance of every packet or cover, containing therein, or having affixed thereto, one or more papers with patterns, or one or more patterns of cloth, silk, stuff, or other goods, or one or more samples of any other sort of thing, not exceeding together one ounce in weight, sent agreeably to the provisions of 26 Geo. III. c. 13. and 35 Geo. III. c. 53, the sum of 1*d.* And for the con-

veyance of every letter, originally sent by the two-penny post, and not first passing, and afterwards to pass by the general post, directed to or sent from places beyond the delivery of the general post letter-carriers, 1*d.*; for every letter originally passing by the general post, directed to places beyond the delivery of the general post, and afterwards delivered by the two-penny post, 2*d.*

Also, by 41 Geo. III. c. 7. for every letter or packet to or from any port of Great Britain, to or from Portugal or the British dominions in America, a single letter, 1*s.*; double, 2*s.*; treble, 3*s.*; an ounce, 4*s.*; and so in proportion for any greater weight. And for the conveyance of letters to or from any port of the united kingdom of Great Britain and Ireland, from or to any place out of the said kingdom not within his majesty's dominions, in addition to all other rates now payable for every single letter, 4*d.*; double, 8*d.*; treble, 1*s.*; an ounce, 1*s.* 4*d.*; and so in proportion. And all such foreign letters shall also be charged with the full inland rates of postage as aforesaid. (37 Geo. III.) Provided that no letter or packets shall be rated higher than as a treble letter, unless one ounce weight, and if an ounce then as four single letters, and so in proportion, reckoning each quarter of an ounce as a single letter. By the 45 Geo. III. c. 11, from March 12, 1805, the following additional sums are made payable for the conveyance of foreign letters, viz. for the conveyance of letters by post from and to Great Britain, to and from parts beyond the seas, not within his majesty's dominions, for every single letter, 2*d.*; for every double letter, 4*d.*; for every treble letter, or other letter under an ounce in weight, 6*d.*; and for every packet not exceeding an ounce in weight, 8*d.*; and so in proportion for every other letter or packet of greater weight than an ounce. And over and above the rates and duties hereby granted, all letters and packets passing from Great Britain to the British dominions in America, to or through the kingdom of Portugal, to the islands of Guernsey and Jersey, and the Isle of Man, and all letters and packets from those respective countries to Great Britain, shall be charged with the inland rate of postage hereby established, of 1*d.* for each single letter, and so in proportion for double, treble, and other letters, according to the weight thereof, for their inland conveyance. But nothing herein shall alter the rates of postage upon single letters sent by the post by or to seamen or privates in the navy, army, militia, fencible regiments, artillery, or marines, upon their own private concerns only, whilst such seamen and privates shall be employed in the public service, made payable by the 35 Geo. III. c. 53. And all printed newspapers sent by the two-penny post, to places beyond the delivery of the general post, shall be chargeable with a duty of 1*d.* only; provided such newspapers be sent in the manner prescribed by an act passed in the 42 Geo. III. c. 63.

By 46 Geo. III. c. 73. is granted (over and above all other rates for such letters and packets within the united kingdom), for every letter and packet carried or conveyed by packet-boats from or to the port of Falmouth, or from or to any other convenient port in the united kingdom, to or from the town and fortrefs of Gibraltar, a packet postage according to the rates and sums in sterling money herein-after-mentioned, the same being rated either by the letter or the ounce. For every single letter, 1*s.* 9*d.*; double, 3*s.* 6*d.*; treble, 5*s.* 3*d.*; and for every ounce, 7*s.*; and so in proportion for every packet of greater weight than an ounce. And to or from the island of Malta, for every single letter, 2*s.* 1*d.*; double, 4*s.* 2*d.*; treble, 6*s.* 3*d.*; ounce, 8*s.* 4*d.*; and so in proportion for every packet of greater weight than

an ounce. And between Gibraltar and Malta, every single letter, *6d.*; double, *1s.*; treble, *1s. 6d.*; ounce *2s.*; and so in proportion for every packet of greater weight than an ounce. And by 48 Geo. III. c. 116, to or from the port of Falmouth, to or from Madeira, single letter, *1s. 6d.*; double, *3s.*; treble, *4s. 6d.*; ounce, *6s.*; and so in proportion for every packet greater than an ounce. And to or from Brasil, or any of the Portuguese territories in South America, single letter, *2s. 5d.*; double, *4s. 10d.*; treble, *7s. 3d.*; ounce, *9s. 8d.*; and so in proportion for any packet greater than an ounce.

By 46 Geo. III. c. 92, seamen, whilst actually employed in his majesty's service, may send single letters on their own private concerns only, at the rate of *1d.* each, to be paid upon putting them into the post-office. Provided that the name of the writer, and his class and description in the vessel to which he shall belong, shall be superscribed; and also in the hand-writing of, and signed by, the officer at the time commanding the vessel, his name, and that of the vessel. And by § 7, such seamen may receive such letters free of postage, provided that *1d.* for each shall be paid upon putting the same into the post-office; and the name of the vessel to which they belong shall be superscribed; provided also that such letters shall be only delivered to the seamen to whom directed, or to persons appointed to receive them by writing under the hand of the commanding officer of the vessel; commissioned officers, or warrant officers, midshipmen, or masters mates, not included in this. By § 8 and 9, the same provisions are extended to every serjeant, corporal, drummer, trumpeter, fifer, and private soldier, in his majesty's regular forces, militia, fencible regiments, artillery, or royal marines, within any part of his majesty's dominions. By § 10, the sections 8 and 9 are not to extend to commissioned officers or warrant officers. By § 11, any such commander wilfully and knowingly writing his name upon any letter that is not from such seaman, &c. shall forfeit *5l.* And by § 12, a like penalty is imposed upon persons not being such commanders writing their name upon any letter, that it may be sent at a lower rate of postage than by law established. And by § 13, a like penalty is imposed upon those who knowingly address a letter to any such seaman, &c. which shall be intended for another person, or concerning the affairs of another person, for the purpose of evading legal postage. By § 14, if any shall procure any such seaman, &c. to obtain the signature of his commanding officer to any letter to be sent by post which shall not be on the private concerns of such seaman, &c.; or if any such seaman, &c. shall himself obtain such signature upon any letter not from such seaman, &c., and upon his own private concerns only, in order to avoid the payment of legal postage, he shall forfeit *5l.* By § 15, one moiety of the penalties imposed by this act to be to the use of his majesty, and the other to him who informs and sues for them.

Bills of exchange, written on the same piece of paper with a letter, and several letters to several persons written on the same piece of paper, shall pay as so many distinct letters. (6 Geo. c. 21.) Writs or other proceedings at law inclosed, or written on the same piece of paper with a letter, shall pay as so many distinct letters. (26 Geo. II. c. 13.) And all merchant's accounts, bills of exchange, invoices, and bills of lading, shall be rated as so many several letters, or by the ounce, according to the rates by this act made payable on letters conveyed by the general post. (41 Geo. III. c. 7.) But patterns and samples of goods inclosed in any cover open at the sides, and without any letter or writing therein, and not exceeding one ounce, shall not be charged with a higher postage than a single

letter. (35 Geo. III. c. 53.) Foreign letters suspected to contain prohibited goods, may, in the presence of a magistrate, be examined by means of a slit not exceeding two inches in length, and if the suspicion be confirmed, they may be opened, the goods taken out and destroyed, and the cover, with a proper attestation, sealed and forwarded to the commissioners of the customs, who shall pay to the said officer any sum not exceeding *5l.*, nor less than *10s.* (24 Geo. III. c. 37.) But if no prohibited article be found, the magistrate shall inclose the letter in a cover, with an attestation that the opening in it was made in his presence, and deliver it so sealed up to the said officer, who shall forward it in the ordinary course without any charge of additional postage.

None but the post-master shall carry letters; on pain of *5l.* for every offence, and *100l.* a week besides; half to the king, and half (with full costs) to him that shall sue in any court of record. (9 Ann. c. 10. § 17. 19.) Except in certain cases, which are also specified in stat. 42 Geo. III. c. 81. § 6. And except in the two universities; to and from which letters may be sent in manner as heretofore hath been used. (§ 32.) The post-master-general may undertake the conveyance and delivery of letters directed to persons abiding in towns and places (not being post-towns), from the respective town to which such letters should be carried by the post in the usual manner, and also the collection of letters from towns, villages, and places to be sent by the post, and may take such sums of money for such extra service as may be agreed upon between him and the inhabitants of such place. (41 Geo. III. c. 7. § 5.) Provided that nothing herein shall prevent the inhabitants of any such towns and places from carrying or employing servants or other persons to carry letters to or from the post-town in like manner as they have been heretofore accustomed to do. And by 46 Geo. III. c. 92. § 2, the post-master-general is authorized to do the same where the towns from whence the letters are to be conveyed are not post-towns. And § 3. contains the same proviso as § 5. of 41 Geo. III. c. 7. And no person shall send or tender or deliver to be sent otherwise than by the post, or by the authority of the post-master-general or his deputy or deputies, or to the nearest and most convenient post-town, to be from thence forwarded by the post, any letter or packet, on pain of *5l.* for every offence, with full costs to the informer in any court of record at Westminster; one moiety thereof to the king, the other moiety to the informer. (42 Geo. III. c. 81. § 5.) Provided, that nothing herein shall extend to any letter concerning goods sent by any common carrier, and to be delivered with such goods, without profit or advantage for receiving or delivering the same; nor any letter of merchants, owners of ships, or merchant vessels, nor any the cargo therein sent on board such vessels to be delivered by the masters thereof, or by any other employed by them for the carriage thereof, without hire or reward for the same; nor any commission or return thereof; affidavits, writs, process, or proceedings, or return thereof, out of any court; nor any letter sent by any private friend in their way of journey, or by any messenger sent on purpose, concerning the private affairs of any person. (§ 6.) If any post-boy shall quit the mail before his arrival at the next stage; or shall suffer any other person (except the person employed to guard the mail) to ride on the horse or carriage; or shall loiter on the road; or shall not in all possible cases convey the mail after the rate of six miles an hour at least; he shall, on conviction by confession, or oath of one witness, before one justice, be sent to the house of correction, to be there kept to hard labour,

labour, not exceeding one month, nor less than fourteen days. (5 Geo. III. c. 25. § 20.) And if any post-boy shall by himself, or in combination with others, unlawfully collect any letters, or convey, or cause them to be conveyed, he shall on conviction by confession or oath of one witness before one justice, forfeit for every letter or packet 10s. to the informer; if not forthwith paid on conviction, to be committed to the house of correction to hard labour, not exceeding two months, nor less than one. (§ 21.) If any person entrusted to take in letters and receive the postage thereof, shall embezzle or apply to his own use any money received by him with such letters for the postage thereof; or shall burn or otherwise destroy any letter or packet by him so taken in or received; or who, by virtue of his office, shall advance the rates upon letters or packets, and not duly account for the money received by him for such advanced postage; he shall be deemed guilty of felony. (§ 19.) And by the 7 Geo. III. c. 50, if any person employed in any business of the post-office, who shall take any letter or packet to be forwarded by the post, and receive any money therewith for the postage, shall burn or destroy any such letter or packet; or shall advance the rate of postage upon any letter or packet, and not duly account for the money by him received for such advanced postage; he shall be deemed guilty of felony. (§ 3.) All sums not exceeding 5*l.* that shall be due from any person for letters, or which shall be received for the carriage of letters, without answering the same to the receiver-general, shall be recovered before justices of the peace in the same manner as small tithes; and such debt shall be preferable in payment before any debt to any private person. (9 Ann. c. 10. § 30.) By the 7 Geo. III. c. 50. § 1. (which re-enacts more at large the provisions of 5 Geo. III. c. 25. § 17.) it is enacted, that if any deputy, clerk, agent, letter-carrier, post-boy, or rider, or any other officer or person whatsoever, employed in receiving, stamping, sorting, charging, carrying, conveying, or delivering letters or packets, or in any other business relating to the post-office, shall secrete, embezzle, or destroy any letter, packet, bag, or mail of letters which such person might be entrusted with, or which shall have come to their hand or possession, containing any bank-note, bank post-bill, bill of exchange, exchequer-bill, South Sea or East India bond, dividend, warrant of the bank, South Sea, East India, or any other company, society, or corporation, navy or victualling or transport-bill, ordnance debenture, seamens' ticket, state lottery ticket, or certificate, bank receipt for payment on any loan, note of assignment of stock in the funds, letter of attorney for receiving annuities or dividends, or for selling stock in the funds, or belonging to any company, society, or corporation, American provincial bill of credit, goldsmiths' or bankers' letter of credit, or note for or relating to the payment of money; or other bond or warrant, draught, bill, or promissory note whatsoever, for the payment of money; or shall steal, or take the same out of any letter or packet that shall come to their hands or possession, such offender or offenders shall be guilty of felony without benefit of clergy. By 42 Geo. III. c. 81, if any deputy, clerk, agent, &c. &c. in the post-office shall secrete, embezzle, or destroy any letter or packet, bag or mail of letters, with which he is entrusted, or which may come into his possession, containing any part or parts of any such security or instrument as in the said act are mentioned, or shall steal or take out of any letter or packet that shall come to his possession, any part or parts of any such security or instrument, every such offender shall be guilty of felony without benefit of clergy. (§ 1.) And if any person whatsoever, whether employed in any business relating to the

post-office or not, shall counsel, command, hire, persuade, procure, aid, or abet any such deputy, &c. or other officer employed, &c. in the post-office, to commit any offence in the said recited act, or in this act before mentioned; or shall with a fraudulent intention buy or receive the whole or any part of such security, &c. which he shall know to have been contained in any such letter, &c. so by any such deputy, &c. secreted or embezzled, or stolen, or taken out of any letter, &c. that shall come to his possession, or which he, at the time of buying or receiving, shall know to have been contained in, and stolen or unlawfully taken out, of any letter, &c. stolen and taken by any person whatsoever, from or out of any mail, bag, &c. or from or out of any post-office, or house or place, for the receipt or delivery of letters, &c.; each and every person so offending shall be deemed guilty of felony, without benefit of clergy; and may be tried and convicted as well before as after the trial or conviction of the principal felon, and whether the principal felon shall have been apprehended, or shall be answerable to justice or not. (§ 2.) If any person shall rob any mail of any letter, packet, or bag; or shall steal and take any letter or packet from or out of any mail or bag, or from or out of any post-office, or house or place for the receipt or delivery of letters, sent to or to be sent by the post, although the same shall not appear to be a taking from the person, or on the king's highway, or to be a robbery committed in a dwelling-house, or a coach-house, stable, barn, or out-house belonging to a dwelling-house; and although it shall not appear that any person was put in fear by such robbery, stealing, or taking; he shall be guilty of felony, without benefit of clergy. (7 Geo. III. c. 50.) This statute, after reciting the stat. 7 Geo. III. c. 50, enacts, that the offences therein mentioned may be laid and tried (if committed in England), either in the county where the offence is committed, or wherein the offender is apprehended; if in Scotland, either in the justiciary court of Edinburgh, or in the court of the circuit within which the felony is committed, or the offender apprehended.

By stat. 42 Geo. III. c. 81. § 4. it is enacted, that if any person shall wilfully secrete, keep, or detain, or being required to deliver up by any deputy, clerk, agent, letter-carrier, post-boy, rider, driver, or guard of any mail-coach, or any other officer or person whatsoever employed in any business relating to the post-office, shall refuse or wilfully neglect to deliver up any mail or bag of letters sent or conveyed, or made up in order to be sent or conveyed by the post, any letter or packet sent by the post, or put for that purpose into any post-office, or house or place for the receipt or delivery of letters, &c., and which letter or packet, bag, or mail of letters, shall have been found or picked up by the same, or any other person, or shall by or through accident or mistake have been left with or at the house of the same, or any other person; each and every person so offending shall be deemed to be guilty of a misdemeanor, to be punished by fine and imprisonment.

The post-masters may charge 3*d.* a mile for each horse riding post, and 4*d.* a mile for the person riding as guide; and shall not charge for any bundle or parcel of goods not exceeding 80*lbs.* weight, to be laid on the horse rid by the guide; and shall not be obliged to carry above that weight. (9 Ann. c. 10.) And whereas by several acts for repairing particular roads, carriages, horses, and other cattle employed in conveying the mail, are exempted from the payment of tolls, and by several other acts horses only are exempted, it is enacted, that all carriages, of what description soever, or horses employed in conveying the mail, shall be exempted from tolls at every turnpike gate; and all gate-keepers

keepers are required to permit such carriages and horses to pass through such toll-gates without demanding any toll. (25 Geo. III. c. 57.) No post-master shall, by word, message, or writing, or in any other manner, endeavour to persuade any elector to give or dissuade any elector from giving his vote for the choice of any person to serve in parliament, on pain of 100*l.*; half to the informer, and half to the poor, and likewise of being incapacitated. 9 Ann. c. 10.

To prevent abuse in the privilege of franking, it is enacted, that if any person shall counterfeit the hand-writing of any person in the superscription, in order to avoid the payment of postage; (or shall alter, or cause to be altered, the date upon such superscription, or write or send any letter, the cover whereof shall be forged, counterfeited, or altered, knowing the same), he shall be guilty of felony, and transported for seven years. 4 Geo. III. c. 24. § 8. 24 Geo. III. c. 37. sess. 2. § 9. 42 Geo. III. c. 63. § 14.

The Great Mogul performs part of his postage by pigeons, kept in several places, for the conveyance of letters on extraordinary occasions. They will carry them from one end of that vast empire to another. The same vehicles have been used by the Dutch in sieges. And Tavernier observes, that the consul of Alexandretta used to send news daily to Aleppo, in five hours time, by means of pigeons; though those two places are three days journey on horseback apart.

POST, *Penny*, or rather now *Two-penny*, a post established for the benefit of London, and the parts adjacent; by which any letter or parcel, not exceeding four ounces weight, unless it be passing to or from the general post-office, is speedily and safely conveyed to all parts within the bills of mortality, to most towns and villages within ten miles of London, for one penny (the original charge) each packet, letter, &c. upon putting in the same, and also a penny (by 34 Geo. III. c. 17. an additional penny, and by 41 Geo. III. c. 7. two-pence) upon the delivery of such as are directed to any place beyond the cities of London and Westminster, the borough of Southwark or suburbs, and within the district of the penny-post delivery. 9 Ann. cap. 10. 4 Geo. II. cap. 33.

The useful conveyance of letters and parcels by the penny-post, was first set up in London and its suburbs, in or about the year 1683, by a private undertaker, to whose assigns government allowed a yearly pension of 200*l.* a-year for life, in lieu of the revenue arising from it. It is said, however, that after a trial in the court of king's bench, the projectors had the mortification to find this office adjudged to belong to the duke of York, as a branch of the general post-office. But the first mention of the penny-post in the statute-book, occurs in the ninth of queen Anne. And though it may be said to have been originally established in 1683, it was very essentially improved in 1794.

By 5 Geo. III. cap. 25. the post-master-general and his deputies may appoint a penny-post office in any city or town, or places adjacent, where they shall judge convenient, and charge therein the same rates as within the limits of the post-office in London. The benefit of this establishment having been long experienced, it was determined, towards the close of the last century, to double the charge, in consequence of which it was denominated the two-penny post.

This office is managed by a comptroller, whose salary is 500*l.* a-year, his clerk, four presidents, six clerks of divisions and six assistants, four sorters, four window-men, six sub-sorters, seven stampers, two inspectors of dead letters, two letter-bill clerks, 257 letter-carriers, a collector, and two sub-collectors, an accomptant, and two clerks. There are five principal offices from which letters are forwarded at certain hours. The two chief offices are, the general-post-

office yard in Lombard-street, and Gerard-street, Soho. There is also a great number of receiving-houses in various parts of London and Westminster, and in the suburbs and villages comprehended within the range of this post; and to the greater number of them it makes three deliveries in a day. The two-penny post rates are as follow: for every letter or packet passing from any part of the cities of London or Westminster, the borough of Southwark, and not beyond the limits of the delivery of the general-post letter-carriers, 2*d.*; for every letter or packet put into the said post to be forwarded to the general post-office, and thence to be conveyed by that post, or coming by the general post-office, 2*d.*; for every letter or packet, passing to or from any part or place within the district of the two-penny post, and not within the delivery of the general-post letter-carriers, 3*d.* It has been already observed, that no letters or packets exceeding four ounces in weight, can be sent by the two-penny post, unless such letters or packets shall have first passed by, or shall be intended to pass by, the general post. The gross produce of the two-penny post for the year ended 5th of January 1813, was 93,629*l.* 11*s.* 11*d.*

Post *Horses, Duty on, &c.* By 44 Geo. III. c. 98. the duties on horses travelling post are as follow: Post-masters, or others, letting horses for this purpose by the mile, or from stage to stage, or letting to hire for a day, or any less period of time than 20 successive days, any horse for drawing any carriage used in travelling post, or otherwise, shall pay annually 5*s.* for a licence, and renew the same ten days before the end of the year, on pain of forfeiting 10*l.* Nor is he allowed to keep more than one horse or carriage with one licence. If the use of such carriage be discontinued, previous notice of seven days shall be given. For every horse hired by the mile or stage in travelling post, shall be charged a duty of 1½*d.* for every mile such horse shall be hired to go; and for every horse hired for a day, or any less period of time, shall be charged, if the distance be ascertained, 1½*d.* per mile, and if the distance be not ascertained, 1*s.* 9*d.* for each horse. (25 G. III. c. 51.) By 42 G. III. c. 100. any horse may be let by a licensed person for any time not exceeding 28 successive days, and every horse hired for a less time, where the distance shall not be ascertained, shall be deemed a hiring for the day; and when the period of hiring shall exceed 28 days, it shall be reckoned as for two or more days; and the persons letting to hire and the persons hiring, shall be liable to the regulations of the 25 Geo. III. c. 51; and the tickets shall be filled up accordingly. Persons letting to hire for any time exceeding 28 days, shall enter in a book provided annually, a memorandum of every ticket issued, with the day of the month, the number of horses, and the period of hiring, together with the name and place of abode of the person hiring the same, to which shall be annexed the name of every servant hired with such horses, and the description of every carriage, on penalty of 50*l.* Where the stamp-office duty is paid, no assessed duty is to attach. Persons letting to hire servants, carriages, or horses, shall annually return lists on pain of 50*l.*, and the hirers of servants, carriages, and horses, shall return lists on pain of 50*l.* and surcharge. Proper forms are to be delivered to persons applying for them, and 50*l.* penalty is charged on those who neglect to deliver accounts within the time prescribed. A list of licensed persons shall be transmitted to the tax-office. Every horse hired by the mile or stage shall be deemed to be hired to travel post, although the person hiring the same do not travel several stages on a post-road, or change horses, and although at the stage or place to which such horses shall be hired there shall not be any post-house, or any post established on such road.

No person unlicensed shall let out any horse for hire, either by the mile or stage, or to draw any carriage used in travelling post, or otherwise by what name soever they may be called for a day, or any less period of time, on pain of 10*l.* Every such licensed person shall cause the words "Licensed to let Post-horses" to be legibly written on his premises, on pain of 5*l.*; and his carriages shall be marked with his christian and surname, and the name of the place of his abode in distinguishable characters, &c., on pain of 5*l.* If the plate bearing his name, &c. shall be taken off for the purpose of evading the payment of the duty, or the sum of 1*s.* 9*d.* for each horse to be paid at the turnpike gates, he shall forfeit 10*l.*; and if a carriage without such plate shall pass through any turnpike gate, the driver shall forfeit 40*s.* Forms of weekly accounts shall be delivered to persons licensed, and also a number of tickets, which shall be duly accounted for. Tickets shall be delivered by every post-master, inn-keeper, &c. letting horses by the mile or stage, to persons so travelling, which tickets shall be delivered by travellers at the first turnpike. A person travelling by the day shall receive a *day-ticket*, which he shall exchange at the first turnpike for another called an *exchange-ticket*, and this ticket shall be shewn by such person at every turnpike through which he shall afterwards pass on that day. A person hiring horses for less than two days, shall have a ticket specifying the place to which the horses are to go, and the true number of miles, both going and returning; and in default of it, the person letting to hire shall forfeit 10*l.* and be liable to the duty. And every person letting to hire horses for two days or more, shall deliver to the traveller or driver of the carriage a note or certificate, expressing "Hired for two or more days," &c. which the traveller shall deliver at the first turnpike, and in return he shall receive a ticket called the "check ticket," which shall be shewn to the gate-keeper at every turnpike through which the said horses shall pass; and in default thereof, every such traveller shall pay for every horse 1*s.* 9*d.* before he be permitted to pass any such turnpike, which the gate-keeper shall retain to his own use. The penalty on delivering false certificates is 20*l.* Horses hired for less than two days are to be deemed as hired for a day; and no horses are to be let to travellers except by the mile or stage. Persons taking the hire for horses shall be accountable for the duty. Every gate-keeper who shall neglect his duty, or transgress with regard to these tickets, &c., shall forfeit 40*s.* Licensed persons are to deliver in their accounts every month, or at the times specified in their licenses, as they reside *within* or *without* the bills, on pain of 10*l.* for every default, and double the amount of the money so due for the non-payment of it. Licensed persons guilty of fraud respecting these duties incur a forfeiture of 50*l.* Their accounts are to be delivered in upon oath. The award to the gate-keeper for his trouble in delivering the day-tickets and posting-tickets which he has received is an allowance after the rate of 3*d.* for every pound which the duties upon any such tickets shall amount to over and above the money returned by him in respect to travellers; not having delivered the tickets to him as aforesaid. Penalty for neglect of duty is 5*s.* for every ticket not delivered to the collector appointed by the commissioners. If he shall wilfully neglect to ask and demand, or refuse to receive, any ticket which should be delivered to him, and to fill the same, he shall for every such offence forfeit 5*l.*; and if he shall fraudulently accept less than he is authorized to demand and receive, he shall in like manner forfeit 20*s.* Nothing in this act shall extend to horses used in licensed hackney coaches, employed to go to no greater distance than 10 miles from London or West-

minster, or the suburbs thereof. (25 Geo. III. cap. 51.) Forging tickets incurs a forfeiture of 50*l.* All pecuniary penalties on this act shall be distributed (if sued for within six calendar months) half to the king, and half (with full costs) to him who shall inform and sue; but if not sued for within six months, they shall belong to the king. Penalties, amounting to 50*l.* or more, shall be sued for in the courts at Westminster; and those under 50*l.* may be recovered before one justice residing near the place where the offence was committed; against whose determination an appeal to the next sessions is allowed.

As for the regulations peculiarly attached to stage-coaches and other carriages, referred to from the article *Stage-Coach*, and in which persons of almost every description are interested, we shall here give a summary of them. By 44 Geo. III. c. 98. every person who shall keep any carriage with two or more wheels to be employed for the purpose of conveying passengers for hire, and accommodating not more than four inside passengers (children in lap excepted), shall take out a licence for each such carriage, and pay yearly 5*s.*; if it carry more than four, but not more than six inside passengers, with the same exception, for each such carriage, 6*s.*; for more than six, but not more than eight (except as before) 7*s.*; for more than eight, but not more than ten, with the same exception, 8*s.*; for more than ten (except as before) each such carriage is to pay yearly 9*s.*

By the 50 Geo. III. c. 48, the 28 Geo. III. c. 57, 30 Geo. III. c. 36, and 46 Geo. III. c. 136, are severally repealed, and various new regulations are enacted. A carriage with four or more wheels, and drawn by four or more horses, shall be allowed to carry ten outside passengers and no more, exclusive of the coachman, but including the guard; and one passenger only shall be allowed to sit upon the box with the coachman, three on the front of the roof, and the remaining six behind, on any part, except on the luggage, or that part of the roof allotted for the same. Carriages drawn by two or three horses shall be allowed no more than five outside passengers, exclusive of the coachman; and all stage coaches, called long coaches, or double-bodied coaches, shall carry no more than eight outside passengers, exclusive of the coachman, but including the guard, if there be any, under such fines and penalties as are imposed by the act; provided that no child in the lap, or under seven years, shall be accounted one of this number, unless there be more than one; and if more, two such children shall be accounted equal to one grown person, and so on in the same proportion; and that no person paying as an outside passenger shall be permitted to sit as an inside passenger, unless with the consent of one at least of the inside passengers, next to whom he shall be placed; provided also, that when the construction is peculiarly wide or commodious, and being so found shall be duly licensed for that purpose, four outside passengers shall be allowed to sit on the front of such carriage; but outside passengers shall never exceed ten in all. No proprietor or driver of any such carriage, travelling for hire, shall permit any luggage to be carried on the roof, or any person to go as outside passenger on or about the outside of any such carriage, the top of which shall be more than eight feet nine inches from the ground, or the bearing of which on the ground shall be less than four feet six inches from the centre of the track of the right or off wheel, to that of the track of the left or near wheel, under the penalty of 5*l.* for each offence. No luggage whatever, exceeding two feet in height, shall be conveyed on the roof of any carriage, if drawn by four or more horses; and when drawn by two or three horses, such luggage shall not exceed eighteen inches above the roof, under the penalty of forfeiting 5*l.* for

POST.

for every inch above two feet or eighteen inches respectively; if the driver so offending shall be the owner, he shall forfeit 10*l.* for every inch above the measure above assigned, and in default of payment, the person or persons so offending shall be committed to the common gaol or house of correction of the county, &c. where the offence was committed for two months, unless such penalties be sooner paid; provided always, that all packages be so placed on the roof, that no passenger shall sit on them, under the penalty of 50*s.* for each offence, to be paid by each such passenger; and the division or space on the top allotted for luggage, shall be distinctly separated from the other part of the top, by some railing or otherwise. However, luggage may be carried of a greater height than two feet, if not more than ten feet nine inches from the ground. The number of passengers permitted to be carried, shall be specified in the licence, and painted on the doors of the coach in legible characters; and commissioners for granting licences may order a cross plate on the side of each coach, with the owner's name, &c. instead of the above inscription; the penalty for defacing, &c. such inscription is a forfeiture of 5*l.*; and every person offending against the provisions of this act, by not having a licence, by omitting the inscription, or carrying more outside passengers than are specified in the licence and in the inscription, as above, shall for every offence forfeit 10*l.* for each outside passenger beyond the number allowed, and double that sum if the driver or coachman be owner or part-owner. The owners of stage-coaches shall be liable to penalties if drivers cannot be found, provided that the owners cannot prove to the satisfaction of the magistrates before whom the information is laid, by sufficient evidence independent of his own testimony, that the offence was committed by the driver without his knowledge, and without any profit accruing to himself; and the driver, when found, shall pay the penalty, or be committed to the common gaol or house of correction, for not less than three, and not more than six months. Drivers who leave their horses or box before they are committed to the care of a proper person, when they stop, shall forfeit not less than 10*s.* nor more than 5*l.* for each offence; and if any driver shall, by intoxication or otherwise, endanger the safety of the passengers, or not take due care of the property with which he is entrusted; or if any driver of any mail-coach, or any guard shall loiter on the road, and retard the arrival of the mails at the next stage; or, if the driver of any mail-coach shall not in all possible cases convey such mails at the speed of any such a number of miles an hour, as are fixed by the post-master general for its conveyance, allowing for weather, bad roads, or any accident to the coach or horses; or, if he shall not duly account to his employer for all monies received on account of passengers or parcels; the driver, in any such case, shall forfeit and pay not less than 5*l.* nor more than 10*l.* for every such offence, and return the money embezzled; and in case of non-payment be committed to the common gaol, &c. for any time not exceeding six months, nor less than three months, at the discretion of a justice or other magistrate. The penalty on a driver for using abusive or insulting language to any passenger, or exacting more than his fare, is a forfeiture of not less than 5*s.* nor more than 40*s.*, or a commitment for any time not exceeding one month, nor less than three days, at the discretion of the magistrate. Passengers are empowered to require toll-collectors to count the number of passengers, and to measure the height of the luggage; and the driver refusing to stop for this purpose, shall forfeit 5*l.* for every such refusal, and if more passengers are carried than the act allows, or the luggage exceed the height assigned by it, he shall forfeit double the penalty imposed by this act for such

offence, one-half to the collector for his trouble, and the other half to the passenger; and if the toll-collector, upon being required by such passenger, shall refuse to make such examination, he shall forfeit 5*l.* for every such offence; and if any person shall endeavour to evade such examination, by descending from such carriage previously to its reaching any turnpike gate, and re-ascending after it has passed such gate, he shall forfeit 10*l.* If the coachman or any other person, having the care of the mail-coach or any other carriage, shall permit any other person, without the consent of a proprietor, or against the consent of the passengers, to drive the same, or quit the box without reasonable occasion, or for a longer space of time than such occasion may require, (though the reins be left for the time in the hands of the passenger on the box); or, if the coachman, or person having the care of the coach, shall by furious driving, or any negligence or misconduct, overturn the carriage, or in any manner endanger the persons or property of the passengers, or the property of the owners or proprietors of such carriage, (unavoidable accidents excepted,) every such coachman or person so offending, shall for every such offence forfeit not exceeding 10*l.*, nor less than 5*l.* If the guard of a mail-coach or other carriage shall fire off his arms, except for self-defence, he shall forfeit 5*l.*

All stage coaches (long-bodied coaches included,) carrying no parcels or luggage, excepting in the inside, or in the front boot, or in a boot behind, and under the body of such carriage; and where the top of such boot behind, when the coach is empty, is not more than six feet from the ground, having obtained a special licence for that purpose, and having the name of the owner, and the number of outside and inside passengers thereby allowed, painted or inscribed thereon, shall be permitted to carry two outside passengers more than the number limited, with respect to other coaches or carriages already described, without subjecting the drivers, &c. to any of the penalties of this act. All prosecutions under this act must be commenced within fourteen days after the commission of the offence. Hackney coaches are exempted from this act. Persons aggrieved may appeal to the quarter-sessions. This act is a public act.

For every coach or other carriage employed as a public stage coach, for the purpose of conveying passengers for hire, shall be charged a duty of 1*d.* (and by 27 Geo. III. c. 16, 1*d.* more) for every mile such carriage shall travel, payable by the owner. (25 Geo. III. c. 51.) As it may be difficult to ascertain the number of times, which licensed carriages which pass from London or Westminster to any place in the country, and from the country again to London or Westminster, making short stages, may go in a day, the commissioners, or any officers appointed by them, may make such allowances as shall appear just, to any licensed person, upon oath made by the owner, of the number of journies actually made in a day, when the same shall differ from the number expressed in the licence. Such carriage shall be marked on the outside pannel of each door by the licensed person, with his christian and surname, and the place from which it sets out, and to which it is going, in large and legible characters, under the penalty of 10*l.*; and the proprietor shall, on the first Monday in every month, or if that be a holiday, on the next day, pay the duties to the receiver-general, or proper officer, at the head-office; and if licensed from any town in the country to any other town beside London, then he shall pay the same to the person authorized to receive it, under the hands and seals of three commissioners; on pain of 5*l.*

By 27 Geo. III. c. 26, the commissioners of the treasury, or those of the Stamp-duties, being authorized by them, may let

let to farm the duties granted by 25 Geo. III. c. 51, upon horses travelling post, and by time, and on stage-coaches. The said duties shall be let for any term not exceeding three years, and the highest bidder shall be the farmer of them for the time appointed. Licensed persons shall deliver their accounts to the contractors. These contractors shall not be disqualified from voting for members of parliament. No licensed persons shall be farmers of the duties.

POST, *Writ of Entry in*, in *Law*. See ENTRY.

POSTS, in *Sculpture*, &c. denote ornaments formed after the manner of rolls, or wreathings; thus called, because they seem to run after one another.

Some are simple; others enriched, or flourished.

POST, *After*, is also a Latin preposition, used in composition with several English words, and generally implying a relation of *posteriority*.

POST, in *Rural Economy*, a strong upright piece of timber, either in a building, fence, or any other situation. Thus we have gate-posts, fence-posts, &c. See GATE-POSTS, and PALING Fence.

POST and Paling, in *Agriculture*, a kind of close wooden fence, constructed by means of posts set into the ground, and pales nailed to rails between them. See FENCE.

This sort of fence can seldom be had recourse to for common farm purposes, except about the buildings or home-stalls. The only circumstances concerning it, which seem to require any notice in this place are, that the posts, whether of rough or sawn timber, should be charred or burnt in a superficial manner, in the parts which are designed to be set in, or nearly on a level with the surface of the ground, in order to prevent their decay in these places. The posts should also be well and firmly put into the earth; and the sawn rails, whether for close or open paling, should be cut triangularwise, by slitting square scantlings diagonally: likewise, the pales of open paling should be cut in the same manner; the broadest sides of the pales being firmly nailed against the broad flat sides of the rails, at such distances from each other, and of such height and strength, as the given purpose may stand in need of or require.

POST and Railing, another sort of open wooden fence, often used for protecting young quick-hedges, consisting of posts and rails, &c. See FENCE.

These sorts of fences, or protections, should likewise have constantly the parts which are set into the ground, and the rails, prepared in the same manner as directed above.

POST and Pan, in *Rural Economy*, a term provincially applied to half timber buildings.

POSTA, LA, in *Geography*, a town of Naples, in Abruzzo Ultra; 11 miles W.N.W. of Teramo.

POSTA St. Lufia, a town of Naples, in the province of Capitanata; 13 miles S. of St. Serviero.

POST-BILLS, BANK, in *Commerce*. See NOTE.

POST-BOOK. See BOOK.

POST-COMMUNION, a prayer which the priest recites after the communion.

POST-DATE. See DATE.

POST-DIEM, a fee by way of penalty, on a sheriff, for his neglect in returning a writ after the day assigned.

For this the custos brevium has four-pence; whereas he has nothing if it be returned at the day.

POST-DISSEISIN, a writ given by the stat. of Westminster, for him who, having recovered lands or tenements by præcipe quod reddat, upon default of redition, is again disseised by the former disseisor: upon which he shall recover damages, and the party suffer imprisonment. See ASSISE of *Novel Disseisin*.

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POSTE, in *Geography*, a river of Brandenburg, which runs into the Warta; 10 miles E. of Custrin.

POSTEA, in *Law*, a return or certificate of the proceedings by nisi prius in the court of common pleas, after a *verdict*, which see; and there afterwards recorded.

If the issue (see ISSUE) be an issue of fact, and upon trial, it be found for either the plaintiff or defendant, or specially; or if the plaintiff makes default, or is non-suit; or whatever, in short, is done subsequent to the joining of issue and awarding of trial, it is entered on record, and is called a "postea." The substance of which is, that *postea*, afterwards, the said plaintiff and defendant appeared by their attorneys at the place of trial; and a jury being sworn, found such a verdict; or, that the plaintiff after the jury sworn made default, and did not prosecute his suit; or, as the case may happen. This is added to the roll, which is now returned to the court from which it was sent; and the history of the cause, from the time it was carried on, is thus continued by the "postea."

POSTEL, WILLIAM, in *Biography*, a celebrated French writer of the sixteenth century, famous for his extraordinary learning and ingenuity, combined during many years of his life with the wildest fanaticism, was born at Barenton, in Normandy, in the year 1505. When he was only eight years of age he had the misfortune to lose both his parents by the plague, and at the age of fourteen he was reduced to such distress for want of means of subsistence, that he was compelled to quit his native place to seek a livelihood among strangers. In these circumstances he undertook to keep a small school at a village near Pontoise, and when he had saved a little money he determined to go to Paris, that he might gratify his avidity for learning, by pursuing his studies in the university of that city. Here, through motives of economy, rendered necessary by his circumstances, he was induced to share with some other scholars the same apartment; but he was so unfortunate in the election of his associates, that during the first night which he spent in their company they deserted him, carrying off with them his money and clothes. Sickness, induced by want, and the extreme of poverty, first threw him into an hospital, where he languished two years, and then left Paris, and obtained admission into the college of St. Barbe, in the humble capacity of a servitor. Here he became, in a short time, conversant with every branch of learning, and his extraordinary acquirements and abilities being made known to the king, Francis I., he was taken under royal patronage, and was appointed to travel into the eastern parts of the world for the purpose of collecting valuable and curious MSS. On his return the monarch was so well pleased with his services, that he gave him the appointment of professor-royal of mathematics, and of the languages, with a considerable salary. He became addicted to judicial astrology, and obtruded his peculiar opinions in his lectures. Postel became attached to the chancellor Poyet, and with him was, through the influence of the queen of Navarre, the king's sister, banished the kingdom. He went to Vienna, and on account of some offence, was soon obliged to quit the Austrian dominions. He now went to Rome, where he was received by Loyola into the newly-formed society of Jesuits, but before his noviciate had expired, he avowed his adherence to the opinion, that the power of councils is superior to that of the popes, and was expelled from the society, and committed to prison in the year 1545. After his liberation, in about twelve months he retired to Venice, where he exhibited many proofs of a deranged mind, and was again thrown into prison for opinions which he propagated. He returned to Paris, where, having undergone a variety of fortunes, he died in 1581, at the age of 76. He was author

of a great number of works: of these, one of the most valuable is entitled "De Orbis Terræ Concordia," the object of which was to contribute his efforts towards bringing the whole world into the belief of the Christian religion. The first book contains proofs of the truth of Christianity; the second a refutation of the doctrines of the Koran; the third treats of the origin of false religion and idolatry, and of the methods to be adopted to convert the Mahometans, Pagans, and Jews. Another of his works was, "A Harmony of the Four Evangelists, or a Discourse concerning the Life of our Saviour Jesus Christ, with the Order of the Gospels, Epistles, &c. together with a brief Description and Map of the Holy Land." "Descriptio Syriæ," 1540. "Of the Republic of the Turks, with an Account of the Laws and Manners of the Mahometans," 1560. "Cosmographicæ Disciplinæ Compendium, cum Synopsi Rerum in toto Orbe Gestarum," 1561. "Alphabetum Linguarum XII. Characteribus differentium, necnon Introductio ac legendi modus," 1538. "De Originibus, seu de Hebraicæ Linguae et Gentis Antiquitate, deque variarum Linguarum affinitate;" and forty or fifty other pieces. Moreri.

POSTEL, in *Geography*, a town of France, in the department of the Two Nethes; 10 miles E. of Tarnhout.—Also, a town of America, in South Carolina; 25 miles S.E. of Queenborough.

POSTËNEIN, a town of Prussia, in Natangen; 24 miles S.E. of Königsberg.

POST-ENTRY, in *Commerce*, an additional entry made by a merchant at the Custom-house, when the first entry which he had made is found to be too small.

POSTENZA, in *Geography*, a town of Naples, in Basilicata; 11 miles S.W. of Cirenza.

POSTERIOR, a term of relation, implying something behind, or that comes after another. In which sense it is used in opposition to *prior* and *anterior*.

POSTERIOR, or *Posteriores Auriculæ*, in *Anatomy*, the muscular fibres usually described under the name of retrahentes auriculares. See EAR.

POSTERIOR *indicis*, POSTERIOR *medii*, and POSTERIOR *annularis*, three interossei muscles of the hand, inserted in the ulnar sides of the respective fingers. The first belongs to the internal interossei, and the two last to the external. See INTEROSSEI.

POSTERIOR *Penis*, a name given by many authors to a muscle more generally known at this time by the name of the erector.

POSTERIOR *Ramus*. See RAMUS.

POSTERIORITY, in *Law*, a term of comparison, and relation in tenure, opposite to *priority*.

A man holding lands or tenements of two lords, holds of his ancient lord by *priority*, and of his later lord by *posteriority*.

POSTERN, or SALLY-PORT, in *Fortification*, a small gate, usually made in the angle of the flank of a bastion, or in that of the curtain, or near the orillon, descending into the ditch; by which the garrison may march in and out, unperceived by the enemy, either to relieve the works, or to make private sallies, &c. See SALLY-PORT.

The word is also used in the general for any private or back-door. "Potestas habere posternam in omni curia penitus inhibeat, sed unicus sit ingressus, &c." Fleta.

POSTEWAR, in *Geography*, a town of Norwegian-Lapland; 100 miles S.W. of Porfanger.

POST-FACTO, Ex. See Ex *Post Facto*.

POST-FINE, a duty belonging to the king for a fine formerly acknowledged before him in his court; paid by the cognizee after the fine is fully passed, and all things touch-

ing the same are accomplished. It is also called the "king's silver."

The rate is so much, and half so much, as was paid to the king for the *præ fine*, or primer fine; or 10s. for every five marks of land, *i. e.* three-twentieths of the supposed annual value; and is collected by the sheriff of the county where the land lies, and to be answered by him into the exchequer.

POSTHORSES, in *Geography*, a rocky islet in the East Indian sea, near the W. coast of the island of Celebes. N. lat. 5°. E. long. 119° 18'.

POSTHUMOUS, or POSTHUMUS, composed of *post*, and *humus*, ground, a child born after the death of his father, or taken out of the body of a dead mother.

By 10 & 11 Will. III. cap. 16. it is enacted, that posthumous children shall be capable of taking in remainder, in the same manner as if they had been born in their father's life time; that is, the remainder is allowed to vest in them while yet in their mother's womb.

In this point the civil law agrees with ours. Ff. 1. 5. 26. Accordingly, an infant *in ventre sa mere*, or in the mother's womb, is supposed in law to be born for many purposes. It is capable of having a legacy, or a surrender of a copyhold estate made to it. It may have a guardian assigned to it. Stat. 12 Car. II. c. 24.

Among the Romans, posthumus was also used for a child born after the making of a testament, which occasioned the testator to alter it.

POSTHUMOUS is also applied figuratively to the works of an author that were not published till after his death, or interment.

POSTICUM, in *Architecture*, the postern gate or back-door of any fabric.

POSTICUS PERONÆUS, *Serratus posticus*, *Tibialis posticus*. See PERONÆUS, SERRATUS, TIBIALIS.

POSTIGLIONE, in *Geography*, a town of Naples, in Principato Citra; 15 miles W. of Cangiano.

POSTIL, POSTILLA, a name anciently given to a note, or remark, written in the margin of the bible; afterwards also to a note written in any other book posterior to the text.

Trivet in his Chronicle, speaking of Step. Langton, archbishop of Canterbury, says, "Super bibliam postillas fecit, &c. eam per capitula, quibus nunc utuntur moderni, distinxit:" that Alexander, bishop of Chester, "super psalterium postillas scripsit." Knighton, another of our historians, speaking of one Hugo, a Dominican and cardinal, says, "totam bibliam postillavit."

POSTILIONS, in *Geography*, a chain of rocks in the East Indian sea, about 60 miles in length, from N.W. to S.E. S. lat. 6° 15' to 6° 48'. E. long. 119° 18' to 119° 54'.

POSTING, among *Merchants*, the putting an account forward from one book to another; particularly, from the journal or waste book into the ledger.

POSTIQUE, formed from the Italian *posticcio*, added, &c. in *Architecture*, &c. An ornament of sculpture is said to be postique, when it is superadded after the work itself is done.

A table of marble, or other matter, is also said to be postique when it is incrustated in a decoration of architecture, &c.

POSTLETHWAYTE, MALACHI, in *Biography*, a merchant of London, published a "Commercial Dictionary," in two vols. folio, which is a work of great labour and utility.

POSTLIMINIUM, POSTLIMINY, among the Romans, the return of one who had gone to sojourn elsewhere, or had been

been banished, or been taken by the enemy, to his own country and state.

It was thus called, according to Aul. Gellius, from *post*, after, and *limen*, threshold; *q. d.* a return to the same bounds, or threshold. Though others after Amm. Marcellinus, will have it so denominated, because persons were restored into the house through a hole in the wall, *post limen*, not by going over the threshold, which was esteemed ominous.

POSTLIMINIUM was also a law or action, by which one recovered an inheritance, or other matter, that had been lost, from a stranger or enemy.

POSTLIMINIUM, *Right of*, in the *Law of Nations*, is that in virtue of which persons and things, taken by the enemy, are restored to their former state, when coming again under the power of the nation to which they belonged.

In order to illustrate and ascertain the foundation of this right, it should be considered, that the sovereign is obliged to protect the persons and goods of his subjects, and to defend them against the enemy; therefore, when a subject, or any part of his substance, is fallen into the hands of the enemy, should any fortunate event bring them again into the sovereign's power, it is certainly incumbent on him to restore them to their former state; he ought to re-establish the persons in all their rights and obligations, to give back the effects to the owners, and, in a word, to settle all things as they were before they fell into the enemy's hands. The justice or injustice of the war makes no difference in this respect; not only because, according to the voluntary law of nations, the war, as to its effects, is reputed just on both sides, but likewise because war, whether just or not, is a national cause; and if the subjects fighting or suffering for it, when fallen themselves (or their effects) into the enemy's hands, are by some fortunate incident returned under the power of their own nation, there is no reason why they should not be restored to their former condition. It is as if they had never been taken. If the war be just, they were unjustly taken: and thus nothing is more natural than to restore them as soon as it becomes possible. If the war be unjust, they are not bound to bear the calamities of more than any other part of the nation. The evil falls on them in being taken; and by their escape or release they are delivered. Here it is again as if they had never been taken; neither their sovereign nor the enemy has any particular right over them. The enemy has lost by one accident what he had gained by another.

Persons return, and things are recovered, by the right of postliminium, when, after being taken by the enemy, they were again under the power of their own nation. Thus this right takes place, as soon as such persons or things taken by the enemy fall into the hands of soldiers belonging to the same nation, or are brought back to the army, the camp, their sovereign's territories, or the places under his command. Our allies, who join with us in a war, make but one party, jointly with us; the cause is common; the right one and the same; they are considered as making but one body with us. Therefore, when persons or things taken by the enemy are retaken by our allies, or our auxiliaries, or in any other manner fall into their hands, this is exactly the same thing with regard to right, as if they were come again into our own power: the power of our allies being in this case but one and the same. The right of postliminium therefore takes place in the hands of those who join with us in the war; the persons and things recovered by them from the enemy, are to be restored to their former condition. Moreover, the right of postliminium necessarily takes place for us within their territories, no less than within our own,

when these allies make one common cause with us and are associates in the war. But if, as in our times is frequently the practice, an ally only furnishes us the succours stipulated in the treaties, without coming to a rupture with our enemy, their two states continuing in their immediate relations to observe the peace, then only those auxiliaries sent by him are partakers and associates in the war. His dominions adhere to their neutrality. The right of postliminium is of no force among neutral nations, for the power inclined to remain neuter in a war, must look on it, as to the effects, equally just on both sides, and consequently, consider whatever is taken by either, as a lawful acquisition. To allow in his dominions that one may claim things taken by the other, or to grant him the right of postliminium in prejudice to the other, would be to declare in his favour, and depart from the neutrality.

If it be inquired what things are recoverable by this right, it may be observed that naturally, goods of all kinds are recoverable by the right of postliminium, and could they be certainly known again, there is no intrinsic reason why moveables should be excepted. Accordingly the ancients, on recovering these things from the enemy, have restored them to their former owners. See several instances in Grotius, b. iii. chap. 16. § 2. But the difficulty of knowing again things of this nature, and the endless disputes which would spring from the re-vindication of them, have in most parts introduced a contrary practice. Farther, from the little hope of recovering effects taken from the enemy, and once carried into a place of safety, the former owners are supposed to have relinquished and given them up. It is therefore with reason that moveables or booty are excepted from the right of postliminium, unless taken from the enemy immediately after the seizure of them; in this case it is neither difficult for them to be known again, nor can the proprietor be supposed to have relinquished them. A custom being once admitted, and well established, it would be unjust to trespass on it. Among the Romans indeed slaves were not treated like other moveables; they, by the right of postliminium, were restored to their masters, even when the rest of the booty was detained; for one manifest reason, it being always easy to know a slave again, and to whom he belonged; the owner also, as he entertained hopes of recovering him, is not supposed to have relinquished his right. Prisoners of war, who have given their parole; territories and towns which have submitted to the enemy, who have sworn or promised allegiance to him, cannot of themselves return to their former condition, by the right of postliminium, for faith is to be kept even with enemies. But if the sovereign retakes these towns, countries, or prisoners, who had surrendered to the enemy, he recovers all his former rights over them, and is to re-establish them in their former condition: they then enjoy the right of postliminium without any breach of their word or violation of faith. The enemy loses by arms the right he had gained by them. But, concerning prisoners of war, a distinction should be made. If they were entirely free on their parole, it is not only coming again under the power of their nation, which can deliver them; because if they had even returned to their home they would still have been prisoners. The will of him who took them, or his total submission, can alone discharge them; but if they have only promised not to run away, a promise they frequently make in order to avoid the evils of a prison, all they are bound to is that of themselves, they shall not quit the enemy's country, or the place assigned for their dwelling: and if the troops of their party should get possession of the place where they dwell, they are by the laws of arms released and restored to their nation, and to their

their former state. Should it be asked, whether a town, surrendering to the enemy's arms, and retaken by those of its sovereign, and thus restored to its former rights, thus recovers such of its possessions as had been alienated by the enemy, when he became master of it? The answer requires us to distinguish between moveable goods, not recoverable by the right of postliminium, and immoveables. As for immoveables, it should be remembered, that the acquisition of a town taken in war is not complete till confirmed by a treaty of peace, or the entire submission or destruction of the state to which it belonged. Till then the sovereign of that town has hopes of retaking it, or recovering it by a peace. And from the moment it returns into his power, he restores it to all its rights, and consequently it recovers all its possessions, as far as in their nature they are recoverable. Therefore it reassumes its immoveables from the hands of those who were precipitate in purchasing them. But if this town had been ceded to the enemy by a treaty of peace, or was absolutely fallen into his power by the submission of the whole state, it has no claim to the right of postliminium; and the alienation of any of its possessions by the conqueror is valid and irretrievable. Should some subsequent fortunate revolution deliver it from the conqueror's yoke, it can revindicate them. When Alexander made a present to the Theffalians of the sum due from them to the Thebans, he was so absolutely master of the republic of Thebes, that he destroyed the city, and sold the inhabitants. The same decisions take place with regard to the immoveables of individuals, prisoners, or not, which have been alienated by the enemy while he was master of the country. A sovereign, taking a prisoner of war, has no other right than to detain him till the end of the war, or till he be ransomed; and has none or any of his rights, unless he can seize them. It is impossible to produce any natural reason why he who has taken a prisoner can have a right to dispose of any goods or possessions but those which the prisoner has about him.

When a nation or state has been entirely subdued, it may be asked whether a revolution can entitle it to the right of postliminium? If this state has not acquiesced in its new subjection, and ceases to resist from mere inability; if the sword of conquest is not laid aside by the victor, and he has not taken up the sceptre of peace and equity, it is only conquered and oppressed, and on being delivered by an ally, it returns without doubt to its former state. He who rescues it from the yoke of the oppressor, should generously restore it to all its rights. But if a state has voluntarily surrendered to the conqueror, and if the people, no longer treated as enemies but as good subjects, have submitted to a lawful government, they are incorporated with the conquering state; they make part of it, and share its fate, their former state is absolutely effaced: whoever the new conqueror be, that afterwards subdues the state to which the vanquished are united, they undergo the destiny of the former. If these people shake off the yoke and recover their liberty by their own virtue, they regain all their rights; they return to their former state, and foreign nations have no right to determine whether they have withdrawn from a legal authority, or whether they have broke their chains. Thus the kingdom of Portugal, which had been invaded and subdued by Philip II. king of Spain, under pretence of an hereditary right, but in effect from avidity aided by a superior force, after groaning under all the miseries of tyranny, recovered the independency of its crown, and regained its ancient rights by driving out the Spaniards, and placing the duke of Braganza on the throne.

Provinces, towns, and countries, which the enemy re-

stores by the treaty of peace, are certainly entitled to the right of postliminium. For the sovereign, in whatever manner he recovers them, is on their returning under his power to restore them to their former state. But whatever is ceded to the enemy by a treaty of peace is truly and fully alienated. It has no longer an affinity with the right of postliminium, unless the treaty of peace be broken and annulled. Moreover, the right of postliminium is secluded after the signature of the peace: this right entirely relates to the state of war. For this very reason there is always an exception in favour of prisoners of war. If the enemy who should have released the prisoners when the war is at an end, having no longer any thing to fear from them, continues the state of war by detaining them in captivity, and more especially if he reduces them to slavery; they have a right, when an opportunity offers, to assert their liberty, to escape from his injustice, and to return into their country, equally as in time of war, since, with regard to them, the war continues; and then the sovereign, from his obligation to protect them, is to restore them to their former condition. They are free even by escaping into a neutral country. Prisoners are to be considered as citizens, who one day may return into their own country, and on their return the sovereign is obliged to restore them to their former state; and therefore the right of those prisoners and the obligations to which they are bound, with the rights of others over them, still subsist entire, and only suffer a suspension in the exercise of part of them, during their imprisonment. The prisoner of war retains therefore a right to dispose of his possessions, particularly in case of death; and the will of a prisoner of war is of force in his own country, unless annulled by some inherent defect. In case of marriage, the captivity of one of the parties does not affect the tie, and on his return home, he, by postliminium, is again entitled to all his matrimonial rights. Among the Romans the right of postliminium was of force even in profound peace, relatively to nations with which Rome had neither connections of friendship, right of hospitality, nor alliance. This was because those people were considered in some measure as enemies. Milder manners have almost every where suppressed this remainder of barbarism. Vattel's Law of Nations, b. iii.

POSTMAN, in the *Court of Exchequer*. See PRECEDENCE.

POST NATI, in *Our Statutes*, is particularly used for such persons as were born in Scotland, after the accession of king James I. to the crown of England.

7 Jac. I. it was by all the judges solemnly adjudged, that such persons were no aliens in England; as, on the contrary, the *ante-nati*, or those born in Scotland before that accession, were aliens here in respect to the time of their birth.

POST-NATUS is also used by Bracton, Fleta, Glanville, &c. for the second son, as distinguished from the eldest. Thus in Brompton, lib. ii. "Est consuetudo in quibusdam partibus, quod post-natus præfertur primogenito."

POST-OFFICE. See Post, *supra*.

POSTOFITTO, in *Geography*, a town of Naples, in Capitanata; 6 miles S. of Monte d'Angelo.

POSTOMIS, among the *Ancients*, a barnacle or iron instrument fixed on the nose, or put into the mouth of a horse, to make him quiet.

POSTPONING, the putting any thing after, or behind another, with regard either to the order of time or place. Sometimes it is taken in an ill part; as when we say, the bookbinder has postponed a sheet, &c. out of a book.

POST-PREDICAMENTS, in *Logic*, are certain general

neral affections, or properties arising from a comparison of predicaments with each other; or modes following the predicaments, and often belonging to many.

Such, according to Aristotle, are *oppositum*, *prius*, *simul*, *motus*, and *habere*: the three first of which are in all predicaments.

POSTSCENIUM, in the *Ancient Theatre*. See PARASCENIUM.

POSTSCRIPT, an after-thought, or article added to a letter, or memoir; containing something learnt or recollected after the subscription or conclusion of the piece.

It is usually marked thus, P.S. The Spectator observes, that a woman's mind is ever better learnt from her P.S. than her letter.

POST-TERM, or POST-TERMINUM, in *Law*, a fee, or penalty, taken by the custos brevium of the court of common pleas, for the return of a writ, not only after the day, but after the term or time in which such writs are returnable; for which the custos brevium has twenty pence.

POSTULATE, POSTULATUM, in *Mathematics*, a clear, evident proposition; wherein it is affirmed, or denied, that something may, or may not be done. See PROPOSITION.

A thing immediately deduced from the consideration of one single definition, if it expresses something to agree or disagree to another, is called an *axiom*. If it affirm, that something may or may not be done, it is called a *postulate*.

Thus, *e. gr.* from the genesis of a circle, it is evident, that all right lines drawn from the centre to the circumference, are equal; since they only represent one and the same line in a different situation: this proposition, therefore, is esteemed an axiom. See AXIOM.

But, since it is evident from the same definition, that a circle may be described with any interval, and from any point, this is accounted a postulate.

Axioms and postulates, therefore, according to some, seem to have nearly the same relation to each other that theorems and problems have: axioms being considered as indemonstrable theoretical truths, and postulata as indemonstrable practical truths.

But others will have it, that axioms, or common notions, are primitive, and common to all things partaking of the nature of quantity, and which, therefore, may become the objects of mathematical science, such as number, time, extension, weight, motion, &c.; and that postulata relate particularly to magnitudes strictly so called, or to things having local extension, such as lines, surfaces, and solids; so that in this sense of the word postulatum, Euclid, besides axioms, or those principles which are common to all kinds of quantity, has assumed certain postulata to be granted him, peculiar to extensive magnitude. Hence several of the principles assumed in his elements, and ranked among the axioms by the moderns, are by Proclus ranked among the postulata; which has induced Dr. Wallis to judge, that the last of the two senses given to the term postulatum is most agreeable to the meaning of the ancient geometers. And those who contend for this sense of the word, add, that Euclid, in postulating to draw a right line from one point to another, does not mean that any man can actually do this, but only that it may be conceived as possible. So that postulata are axioms no less than the other principles assumed in the elements of geometry, but axioms relating to a particular subject, and not common to all. Wallis's Oper. vol. i. p. 667, 668. See PRINCIPLE.

POSTULATION, POSTULATIO, in the *Common Law*, the nomination of a person to a dignity in the church, to which, by the canons, he cannot be elected; as, for want

of age, of birth, because already possessed of a benefice incompatible therewith, or for the like impediment.

Thus the formal election of such a person being faulty, they are obliged to proceed by way of postulation; that is, the chapter beseeches the person, to whom the confirmation of the election belongs, to approve of it, though it be not canonical. See ELECTION.

The person to whom the supplication is made by the Protestants in Germany, is the emperor; by the Papists, the pope.

Wicquefort observes, that when a part of the chapter elects, and another postulates, the number of postulants must be twice as great as that of the electors, to bring the matter to a postulation.

POSTURES of the Body. The continued unnatural postures of the body are the occasions of many very unhappy effects in the human frame; crookedness in shape is very frequently the consequence of them.

And it is no uncommon thing to see school-boys, who are forced to be continually bending to write upon their knee, or upon a low form, very terribly afflicted by means of the compression which that unnatural and continued posture has given the lower part of the breast, and the viscera contained in the epigastrium; and particularly those unhappy youths, who, from being short-sighted, are exposed to a greater degree of stooping than the rest, have been found terribly afflicted with disorders of the breast and of the lower belly.

On applying for relief in these complaints, the physician usually forgets to inquire into the cause, and hearing nothing of the continued bending posture of the body, which is the occasion of all the disorders, the medicines he gives prove ineffectual with some, and with others greatly heighten the disorder.

But when the prescriber will be at the pains of informing himself of the cause in these cases, and forbid the continuance of the posture, which has been the sole occasion of them; nature alone will often make the cure, or if not alone, yet very often with this caution the methods will prove successful, which were ineffectual, or even hurtful without it.

POSTURE, in *Painting* and *Sculpture*, the situation of a figure with regard to the eye, and of the several principal members of it with regard to one another, by which its action is expressed.

A good part of the painter's art consists in adjusting the postures; in giving the most agreeable postures to his figures; in accommodating them to the characters of the respective figures, and the part each has in the action; and in conducting and pursuing them throughout.

Postures are either *natural* or *artificial*.

The *natural* are such as nature seems to have had a view to in the mechanism of the body; or rather, such as the ordinary actions and occasions of life lead us to exhibit while young, and the joints, muscles, ligaments, &c. are flexible.

Artificial postures are those which some extraordinary views or occasions lead us to exhibit. Such, *e. gr.* are those of our balance and posture-masters.

A painter would be strangely puzzled with the figure of Clark (a famous posture-master of Pall-mall), in a history-piece. This man, we are told in the *Philos. Trans.*, had such an absolute command of his muscles, &c. that he could disjoint almost his whole body; so that he imposed on that great surgeon Mullens, who looked on him to be in such a miserable condition, he would not undertake his cure. Though a well-made man, he would appear with all the deformities

formities imaginable; hunch-backed, pot-bellied, sharp-breasted, &c. He disjoined his arms, shoulders, legs, and thighs; and rendered himself such an object of pity, that he has frequently extorted money, in quality of a cripple, from the same company he had the minute before been in, in quality of a companion. He would make his hips stand a considerable way out from his loins, and so high as to invade the place of his back. Yet his face was the most changeable part about him, and shewed more postures than all the rest.

POSURE, in *Geography*, a town of New Navarre; 220 miles S.S.E. of Casa Grande.

POSZEGA. See **POSEGA**.

POT, in our *Old Writers*, a head-piece of war. It is mentioned stat. 13 Car. II. c. 6. The pot was an iron hat with broad brims. See *Grofe's Mil. Ant.* vol. ii.

POT, a liquid measure at Paris, and in other parts of France, called also quarte, 144 of which are equal to 36 fetiers = a muid. At Lyons, the wine measure, called "anéé," or "afnée," contains 88 pots, each equal to a Paris pint; so that the afnée is = $24\frac{3}{4}$ English gallons very nearly. The pot is divided into 2 chopines, or 4 demi-fetiers. At Bourdeaux, 181.18 pots = 100 English gallons, and each = $127\frac{1}{2}$ cubic inches. At Dunkirk, 167.39 pots = 100 English gallons, and each = 138 cubic inches. At Geneva, 401.74 pots = 100 English gallons, and each = $52\frac{1}{2}$ cubic inches. At Lyons, 403.49 pots = 100 English gallons, and each = $57\frac{1}{2}$ cubic inches. At Marfeilles, 380.75 pots = 100 English gallons, and each = $60\frac{3}{4}$ cubic inches. At Montpellier, 358.14 pots of wine = 100 English gallons, and each = $64\frac{1}{2}$ cubic inches; and 363.78 pots of oil = 100 English gallons, and each = $63\frac{1}{2}$ cubic inches. At Paris, 201.75 pots = 100 English gallons, and each = $114\frac{1}{2}$ cubic inches. At Rouen, 232.16 pots = 100 English gallons, and each = $99\frac{1}{2}$ cubic inches. At Strasburg, 197.43 pots = 100 English gallons, and each = 117 cubic inches.

POTS, Fire. See **FIRE-Pots**.

POTS, Garden, such as are made use of for plants and flowers.

Pots of these kinds are particularly necessary in the culture of numerous sorts of plants, such as all tender exotics of the green-house and stove sorts; which must be planted in them, for the convenience of moving them in and out of their departments, as there may be occasion.

They are also exceedingly useful in raising many young seedlings and cuttings, that require moving to occasional shade, shelter, and artificial heat; likewise for many young plants that are tender whilst young, and require to be removed under shelter for the first two or three winters, but become hardy enough afterwards to bear the full air the year round; and likewise to plant many of the more curious hardy flowering plants, and others, and choice flowering shrubs, &c. in, to remove occasionally, to adorn particular compartments or situations.

In general there are about eight different sizes of this sort of pots made use of, which are necessary in order to suit the different sorts of plants, as well as all sorts in their different stages of growth: as when the plants are young, and of small size, they may be first planted in small ones; and as they increase in bulk, be shifted into those a size larger, repeating it as often as necessary. See **PLANTING in Pots**.

The several sizes are in regular gradation, each size having its name, for the convenience of readily supplying the sizes wanted for particular uses, being always reckoned by the cast at the houses, from two to sixty pots to each,

according to their sizes; the largest having only two to a cast, and the smallest sixty; so that, being of eight different sizes or casts, they are distinguished by the following terms, twos, eights, twelves, sixteens, twenty-fours, thirty-twos, forty-eights, and sixties; the several casts from the twos being in a gradual diminution in size, and the price of the different casts is the same; those of two, &c. being as much as those of sixty, and so of the rest. From two to three shillings is the general price *per* cast, at the potteries in the vicinity of London.

In garden pots there is also a particular shallow sort of a wide, squat, pan-form make, used on some occasions, especially among the myrtle-gardeners in the neighbourhood of London, in raising great quantities of these plants annually, in order to have always a regular succession advanced to proper growth for the markets. These kinds of wide shallow pan-pots are employed to prick or plant out the requisite supplies of numerous small myrtle-cuttings, in summer, &c. for annual propagation, and which are commonly called store-pans.

In these store-pans they generally prick a great number of such small slips or cuttings, at only about an inch or two apart, often to the amount of hundreds in each, just to strike them, and remain two or three months, or more, till advanced a little in growth; in which time the pans thus stored are convenient for removing to different situations required, such as, at first planting or afterwards, either into a hot-bed, whereby to strike the cuttings more expeditiously, or, for the same advantage, when in want of hot-beds, to be placed under a garden-frame and lights, or under hand-glasses, either with or without a hot-bed; and also for removing to a green-house or garden-frame, for protection in winter, &c. all of which being thus continued in them, according to the progress of growth which they make; so that when they discover themselves to be well struck in bottom radicles, and have shot a little top, they may be pricked out separately into small pots, or occasionally three, four, or five in larger ones, for a year, then separated as above; or sometimes bedded out in the spring, in beds of natural earth, six or eight inches apart, to acquire an advanced state of growth till autumn, and then potted off singly.

The same kind of pan-pots are also useful for several other purposes of propagation, both to sow seeds and plant small cuttings, slips, &c. in, of tender exotics, and of various other sorts of curious or particular kinds of plants, both of the green-house, hot-house, and the open ground, in order to have similar culture as the above. These pan-pots are from ten to twelve or fourteen inches in width, and about six inches deep, having holes at bottom, as in the common kind. And another sort of pot, of different make from the general kind, is sometimes used for planting some kinds of bulbous roots in, for blowing in the apartments of the house: they are narrow and upright, of equal width from bottom to top, six, eight, or ten inches deep, or a little more, and from three to four or five inches in width; and are occasionally used for planting bulbs of the Guernsey lily, and some other similar kinds, to blow in autumn and winter, in the windows, or on the chimney-piece of the dwelling or sitting-room, or in a green-house, or hot-house, &c. as they appear neat, and admit of being placed close, or in a smaller space than the common pots, one bulb being planted in each; they being previously filled with light sandy earth to near the top. See **PLANTING in Pots**.

All these several sorts of pots may be obtained at the potteries in the different parts of the kingdom.

In choosing the pots, it is necessary to see that they are burnt

burnt sufficiently hard, and so perfectly found as to ring, when struck with your knuckles; and that they have all holes at the bottom, to discharge the superfluous moisture from the earth about the roots of the plants; the larger sorts having generally four holes, one in the middle of the bottom, and three around the circumference, at equal distances; but the smaller kinds commonly only one in the middle of the bottom.

In respect to the sizes of pots that are proper for the different sorts of plants, it is commonly mentioned in the culture of the plants where any particular sizes are necessary.

Where small pots are advised, it is generally to be understood either as sixties, forty-eights, or thirty-twos, according to the sorts or sizes of the plants that are to be potted.

POTS, *Glass*. See GLASS-Pots.

POT, *Hotch*. See HOTCH-Pot.

POT, *White*. See WHITE.

POTABLE, POTABILIS, somewhat that may be taken, or swallowed by way of drink.

The alchemists talk much of potable gold, *aurum potable*. See AURUM.

POTALIA, in *Botany*. See NICANDRA.

POTAM, in *Geography*, a town of New Mexico, in the province of Hiaqui; 54 miles S.W. of Riochico.

POTAMI, a town of the island of Corfu.

POTAMO, in *Biography*, a Platonic philosopher of Alexandria, and the first projector of the Eclectic sect, is said to have flourished under the reign of Augustus; but according to Diogenes Laertius, he commenced his design towards the close of the second century. This author says, that not long before he wrote his "Lives of the Philosophers," an Eclectic sect had been introduced by Potamo of Alexandria, which was to embrace tenets collected from every former sect. Potamo, it should seem, endeavoured to reconcile the precepts of Plato with those of other masters. Attempts of the same kind had been made by other Alexandrian philosophers, from the first commencement of their schools; but he was probably the first who attempted to institute a new sect upon this principle, in which it is almost certain he failed of success. This philosopher is to be distinguished from a rhetorician of the same name, who was a native of Lesbos, or Mitylene, and flourished under the reign of Tiberius. He was the author of "A History of Alexander the Great;" "Panegyrics" on Brutus and Tiberius Cæsar; a treatise "Concerning a perfect Orator," &c. Enfield's Hist. Phil.

POTAMOGETON, in *Botany*, Pond-weed, *ποταμογεῖτων* of the ancient Greeks, so called from *ποταμος*, a river, and *γεῖτων*, a neighbour or ally, because it grows in water.—Linn. Gen. 67. Schreb. 92. Willd. Sp. Pl. v. 1. 712. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 193. Ait. Hort. Kew. v. 1. 279. Brown Prodr. Nov. Holl. v. 1. 343. Juss. 19. Lamarck Illustr. t. 89. Gærtn. t. 84.—Class and order, *Tetrandria Tetragynia*. Nat. Ord. *Inundatæ*, Linn. *Naiades*, Juss. *Alismaceæ*, Brown.

Gen. Ch. *Cal.* none. *Cor.* Petals four, roundish, obtuse, concave, erect, with claws, deciduous. *Stam.* Filaments four, flat, obtuse, very short; anthers short, of two round lobes. *Pist.* Germens four, ovate, pointed; styles none; stigmas obtuse. *Peric.* none. *Seeds* four, roundish, pointed, gibbous at the outer side, compressed and angular at the inner.

Eff. Ch. *Calyx* none. *Petals* four. *Styles* none. *Seeds* four, naked.

This genus is entirely aquatic, floating for the most part

under the surface of fresh-water pools and rivers, only throwing up its flowering spikes to a small height above that level, in order that the pollen may escape injury. The herbage of all the species is semipellucid, and highly vascular, imbibing and exhaling moisture with great facility from every part; their general colour is a dull olive-green, verging, in some instances, to a brighter green, in others to a reddish hue. They are all herbaceous, perennial, branched, devoid of pubescence. Linnæus, in the second edition of Sp. Pl., reckons up twelve species, of which *pedunculatum* and *marinum* prove to be one and the same, and *ferratum* is not well understood. Except perhaps this last, all are natives of Britain, as are the new ones added by Willdenow. We shall therefore treat of the whole fourteen species of this author. Four of them have been observed in New South Wales, by Mr. Brown, but no new ones.

1. *P. natans*. Broad-leaved Pond-weed. Linn. Sp. Pl. 182. Willd. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 1822. Fl. Dan. t. 1025. Mill. Illustr. t. 11. (*P. latifolium*; Ger. Em. 821.)—Upper leaves oblong-ovate, stalked, floating; those below the surface linear.—Common in the ponds and rivers of Europe, and found also in New South Wales and Van Diemen's land. With us it flowers in July. The root consists of long simple fibres, running deep into the mud. Stems many feet in length, much branched, round, leafy. The broad, dark-green, floating upper leaves cover the surface of the water, being each about three inches long, and one and a half broad, on longish stalks. Stipulas almost equal in length to the footstalks, and placed between them and the stem, linear, acute. Bractæas like them, one to each solitary thick flower-stalk. Spike simple, raised two or three inches above the water, and composed of several brownish-green, sessile, vertical flowers.

2. *P. fluitans*. Long-leaved floating Pond-weed. Roth. Germ. v. 1. 72. v. 2. 202. Willd. n. 2. Fl. Brit. 1391. Engl. Bot. t. 1286.—Lower leaves lanceolate, pointed, membranous; upper elliptic-lanceolate, somewhat coriaceous; all of them stalked.—Native of pools and slow rivers in Germany and some parts of England; also in North America. The whole of the herbage is nearly under water, the uppermost leaves only being somewhat floating, but scarcely horizontal. Their shape is much more oblong than in the former, and their colour reddish, like that of the spikes of flowers. Willdenow suspects this to be a variety of the preceding, but surely without reason. He allows it to remain permanently distinct about Berlin.

3. *P. heterophyllum*. Various-leaved Pond-weed. Schreb. Lips. 21. Willd. n. 3. Fl. Brit. 1390. Engl. Bot. t. 1285. (*P. palustre*; Teesdale Tr. of Linn. Soc. v. 5. 43. *P. gramineum*; Fl. Dan. t. 222, wanting the upper leaves.)—Leaves under water membranous, linear-lanceolate, sessile; the upper ones floating, coriaceous, elliptical, stalked. Flower-stalks swelling upwards.—Native of ditches and still pools in Germany and Britain. This bears most resemblance to the first, but is in all its parts scarcely half so large. The colour is bright olive. The floating leaves are chiefly produced in autumn, when the flowers most abound, and the whole plant is very much branched. The flower-stalks are club-shaped.

4. *P. perfoliatum*. Perfoliate Pond-weed. Linn. Sp. Pl. 182. Willd. n. 4. Fl. Brit. n. 2. Engl. Bot. t. 168. Fl. Dan. t. 196. (*P. tertium Dodonæi*; Ger. Em. 822.)—Leaves heart-shaped, clasping the stem, all below the surface.—Frequent in ditches and pools throughout Europe, especially on a clay soil. It occurs also at Port Jackson. The whole plant, except the short brown spikes, is immersed in the water. The leaves are scarcely two inches long,

long, of a broad heart-shaped form, ribbed, brittle, and highly vascular. They are not truly perfoliate, but, from clasping the stem, have that appearance.

5. *P. densum*. Close-leaved Pond-weed. Linn. Sp. Pl. 182. Willd. n. 5. Fl. Brit. n. 3. Engl. Bot. t. 397. (*P. feu Fontinalis media lucens*; Bauh. Hist. v. 3. 769.)—Leaves ovate, pointed, opposite, crowded. Stem forked. Spike of four flowers.—Native of pools, ditches, and slow rivers, in England, France, and Italy, flowering in June. The leaves are numerous, crowded, scarcely above an inch long. Flower-stalks solitary from the forks of the stem, recurved. Spike very short, pale green, of four, sometimes only two, flowers, which are all that appears of the plant above the water, and for a short period only.

6. *P. lucens*. Shining Pond-weed. Linn. Sp. Pl. 183. Willd. n. 6. Fl. Brit. n. 4. Engl. Bot. t. 376. Fl. Dan. t. 195. (*P. longis acutis foliis*; Ger. Em. 822.)—Leaves ovato-lanceolate, flat, tapering at their base. Spike dense, many-flowered.—A very frequent plant in the ponds, ditches, lakes, and rivers of Europe, growing entirely under water, except the flowers, which appear in June and July, and compose dense, longish, pale-olive spikes. The stipulas are large, clasping the stem. Leaves a span long, and about an inch, or more, in breadth.

7. *P. lanceolatum*. Lanceolate-leaved Pond-weed. Engl. Bot. t. 1985. (*P. setaceum*; Linn. Sp. Pl. 184? Fl. Brit. n. 10? *P. ramosum angustifolium*; Bauh. Pin. 193. Prodr. 101?)—Leaves lanceolate, membranous, flat, entire; contracted at their base. Spike ovate, dense, of few flowers.—Native of ditches in turfy bogs, or of alpine lakes, in Europe. The Rev. H. Davies sent the plant of Engl. Bot. from Wales, and the more we consider the characters and descriptions of the Linnæan *P. setaceum*, the more we are convinced of our's being that obscure species, of which no specimen exists in the herbarium of Linnæus; and which is therefore to be made out from Bauhin only. Nevertheless, we cannot be quite certain, and therefore dare not adopt the name of *setaceum*, which is indeed very inapplicable to the Welsh plant. What Hudson intended is not to be ascertained. Our *lanceolatum* is, in all its parts, but about one-fifth the size of *lucens*. The stipulas are involute and tubular. Flowers small, few, in a short ovate spike. The stem is round, and almost capillary.

8. *P. crispum*. Curled Pond-weed. Linn. Sp. Pl. 183. Willd. n. 7. Fl. Brit. n. 5. Engl. Bot. t. 1012. Curt. Lond. fasc. 5. t. 15. Fl. Dan. t. 927. (*Tribulus aquaticus minor, quercus floribus*; Ger. Em. 824.)—Leaves lanceolate, alternate, wavy, ferrated.—Common in European rivulets and clear ditches, flowering with us in June and July. It occurs also in New Holland. Larger than the last, with an angular stem. Leaves obtuse, much curled or waved, all immersed, mostly alternate; but in a variety, which is Hudson's *ferratum*, the upper ones are opposite. Flower-stalks above the surface, each bearing a lax spike of reddish flowers, not ill-compared by old writers to oak blossoms.

9. *P. ferratum*. Serrated Pond-weed. Linn. Sp. Pl. 183. Willd. n. 8?—Leaves lanceolate, opposite, obtuse, serrated, slightly wavy.—Native of rivulets in Europe. Linn. The Linnæan specimen is but imperfect, yet it seems different from the foregoing. We have found nothing in Britain exactly like it. The leaves are sharply and thickly serrated. Willdenow says his *ferratum* has perfectly entire leaves, which is rather paradoxical. The matter must for the present still remain in doubt.

10. *P. compressum*. Flat-stalked Pond-weed. Linn. Sp. Pl. 183. Willd. n. 9. Fl. Brit. n. 6. Engl. Bot. t. 418.

Fl. Dan. t. 203.—Leaves linear, obtuse. Stem compressed.—In the ditches and slow rivulets of England, and other parts of Europe, flowering in the middle of summer. The stem is remarkably flat, zigzag, floating entirely under water. Leaves bright green, long, narrow, obtuse, grassy; alternate, except under each flower-stalk. Stipulas broader than the leaves, flattened, and somewhat angular, pale, often cloven. Flower-stalks flat, rising out of the water, each bearing about four or six flowers, in distant pairs.

11. *P. gramineum*. Grassy Pond-weed. Linn. Sp. Pl. 184. Willd. n. 12. Fl. Brit. n. 7. Engl. Bot. t. 2253. (*P. gramineum latiusculum, foliis et ramificationibus densissime stipatis*; Dill. in Raii Syn. 149. t. 4. f. 3.)—Leaves linear-lanceolate, alternate, sessile, broader than the stipulas. Stem round, somewhat forked.—Native of ditches and pools in Europe, but rare. Mr. Brown found it at Port Jackson. Lightfoot erroneously cites, with commendation, the t. 222 of Fl. Dan. which undoubtedly represents our *heterophyllum*, n. 3, without its upper leaves. The present species has often been supposed not to differ from the last; but it is larger, more dense in foliage, and, if we are not much mistaken, the above specific characters will always distinguish the two.

12. *P. pusillum*. Small Pond-weed. Linn. Sp. Pl. 184. Willd. n. 14. Fl. Brit. n. 8. Engl. Bot. t. 215. (*P. pusillum, gramineo folio breviori*; Vaill. Paris. t. 32. f. 4.)—Leaves linear, opposite or alternate, narrower than the stipulas, spreading at their base. Stem round. Flower-stalks axillary.—In clay ditches and pools, sometimes on turfy bogs, throughout Europe, flowering in summer and autumn. The whole herb is immersed in water, except the flowering spikes, as usual in this whole genus. The stem is slender, alternately branched, striated. Leaves linear, very narrow, hardly above an inch long, and greatly exceeded in breadth by their stipulas. Spike ovate, dense, small, of few flowers.

13. *P. pectinatum*. Fennel-leaved Pond-weed. Linn. Sp. Pl. 183. Willd. n. 10. Fl. Brit. n. 9. Engl. Bot. t. 323. Fl. Dan. t. 186. (*P. marinum*; Linn. Sp. Pl. 184. Willd. n. 13. *P. ingens, gramineo folio longiori*; Vaill. Paris. t. 32. f. 3.)—Leaves in two ranks, crowded, parallel, bristle-shaped, sheathing at their base.—Common in ditches and rivers, either of fresh, or partly salt, water, flowering, but not constantly, in July. The creeping root springs from a small knob. Herb immersed far under the surface, bushy and much branched. Leaves copious, three or four inches long. Stipula united to the base of the leaf internally, membranous at the edge, cloven. Spikes interrupted, many-flowered, often supported by long slender stalks, to elevate them above the water. The lowest flowers are very remote. The *P. marinum* of authors is actually not to be distinguished, even as a variety.

POTAMOPHILA, from ποταμος, a river, and φιλεω, to love, alluding to its watery place of growth.—Brown Prodr. Nov. Holl. v. 1. 211.—Class and order, *Hexandria Digynia*. Nat. Ord. *Gramina*.

Ess. Ch. Flowers polygamous; mostly monoecious; the males superior, with rudiments of pistils; females with rudiments of stamens. Calyx, in both, minute, single-flowered, of two valves. Corolla of two valves, awnless, membranous; the outer valve with five ribs, inner with three. Nectary of two scales. Stigmas feathery.

1. *P. parviflora*. Gathered by Mr. Brown at Port Jackson, New South Wales. This is a perennial aquatic grass, from three to five feet high, forming dense, and often broad, tufts in the rivers. The stems are somewhat branched. Leaves narrow, slightly involute. Stipula long,

torn. *Panicle* loose, erect. The genus is closely allied to *Oryza* and *Zizania*. *Brown*.

POTAMOPITYS, *Buxbaum's* name for the *Elatine* of *Linnæus* and all other authors, expressing its native situation, in rivers, and its *fir-like* aspect; from *ποταμος* or *πίλις*.

POTAMOS, or POTAMUS, in *Ancient Geography*, a maritime place of Asia, in Galatia, between *Stephanæ* and *Leptisæra*.

POTAPAUGE, in *Geography*, a town of America, in Middlesex county, and state of Connecticut.

POTAPOVA, a town of Russia, in the government of Irkutsk, on the Lena; 52 miles S. of Kirensk.

POTASH, *Vegetable fixed alkali*; in French *la potasse*. The term potash is commonly applied, in commerce, to the impure carbonate of potash, which is obtained from the ashes of vegetables. The history of potash in this state, and the various modes by which it is procured, are detailed at full length under the head CARBONAT of Potash. It remains now for us to consider the substance called *potash*, in a *chemical* sense, that is, separated not only from carbonic acid, but also from all the foreign ingredients with which common potash is contaminated.

It may be proper to premise, that although all the potash of trade is obtained from the vegetable kingdom, yet the term *vegetable*, as applying exclusively to this alkali, is not strictly correct, since potash has been found to enter into the composition of various earthy minerals, and has also been proved to exist in the blood of animals.

Potash may be obtained in a state of purity, by various methods. The following process, recommended by *Berthollet*, is perhaps, upon the whole, the most easy and the most effectual. One part of pearl-ash is mixed with one part and a half of quick-lime, and ten parts of water, and the mixture is boiled for some hours; it is allowed to stand for a day or two, and afterwards filtered. It is then quickly concentrated by evaporation in a silver vessel, till it assumes the consistence of honey; and upon this evaporated mass alcohol is poured, to the amount of one-third in weight of the pearl-ash used. This solution is then boiled for a minute or two, and inclosed in a glass vessel. The liquor soon separates into two strata. The inferior stratum contains the impurities, partly dissolved in water, and partly in a solid state. The superior stratum is the solution of potash in alcohol, which has a brown colour. The liquor is then decanted and rapidly evaporated in a silver vessel, till a crust begins to form on its surface, and being now poured into a porcelain vessel, it concretes in a white mass, which is pure potash.

The theory of this process is obvious; the lime separates the carbonic acid, for which it has a stronger affinity than the potash; and the alcohol, by dissolving the potash, separates the other impurities which are not soluble in this menstruum.

But without the assistance of alcohol, potash may be, in a great measure, purified from the other salts mixed with it, by solution in water and evaporation. The potash being much more soluble than the other salts, the latter crystallize, and, with proper management, may be almost entirely removed.

The pharmacopeia of Berlin directs, at *Klaproth's* suggestion, to prepare caustic potash, by boiling for a quarter of an hour, in an iron kettle, two pounds of potash obtained from calcined tartar, with three pounds of pulverized quick-lime, and a sufficient quantity of water. The mixture is then filtered and evaporated till the liquor acquires the specific gravity of 1.33. In this state, it is preserved in close vessels, under the name of *lixivium causticum*, and is sufficiently pure for most purposes.

Pure potash is a white brittle substance, having a slightly urinous smell, and an exceedingly acrid taste; it is eminently caustic, so that when applied to any part of the body, it destroys it almost instantaneously, and is often used by surgeons, under the name of *potential cautery*, to open abscesses, and to destroy excrescences. Its specific gravity is 1.7.

The nature of the change which causes common potash to acquire such powerful caustic properties, either by the processes above-mentioned, or simply by exposure to heat, is evidently the expulsion of the carbonic acid gas, the presence of which, in carbonate of potash, renders the alkali mild and inoffensive. This, however, was for a long time entirely misunderstood, and it was not until the masterly researches of *Dr. Black* in 1756, that distinct notions were formed on the subject.

When heated, potash fuses. At a red heat it swells and slowly volatilizes with a white acrid smoke. In an intense heat it becomes greenish, but without undergoing any other change. When exposed to the air, it quickly attracts carbonic acid and moisture.

Cold water dissolves about two parts of potash; the solution is transparent, and of a thick oily consistence. By slowly evaporating this solution, crystals of pure potash may be obtained, which sometimes assume the form of octohedral groups, or at other times that of thin transparent laminæ, according to the degree to which the evaporation has been pushed.

When four parts of pulverized potash are mixed with one of snow, the mixture becomes liquid, and a considerable degree of cold is produced; whilst, on the contrary, if cold water be poured upon dry potash, a considerable heat is evolved, phenomena which afford a striking illustration of the doctrines of latent heat.

Potash is capable of entering into combinations with sulphur and phosphorus, forming sulphurets and phosphurets; and it also unites with several of the earths. With siliceous earth, in particular, it forms glass, and with the various kinds of oils and fat, it forms soap. It also combines with all the acids; but the history of these interesting compounds will be found treated of under their respective names.

Such is the attraction of potash for water, that no degree of heat known can entirely deprive potash of moisture. On the contrary, it has been shewn by *Davy* and others, that the driest potash prepared by the processes above described, is a true *hydrat of potash*, containing at least 17 or 18 parts of water in 100 of potash. This water, however, may be expelled by chemical affinities; thus, for instance, if the potash be made to act upon iron turnings, at a dull red heat, the iron becomes oxydated, hydrogen is given off, and the alkali is found to have become harder, less fusible, more opaque, and of greater specific gravity.

Potash, until *fir Humphry Davy's* memorable discovery of its chemical nature, was considered as a simple body, though strong suspicions were entertained of its being of a compound nature. From that philosopher's researches, however, potash appears to consist of a metallic basis, which he called *potassium*, united with oxygen, in the following proportions:

Potassium	83
Oxygen	17

	100

The particulars of this discovery will be found fully stated under the head POTASSIUM. M.

To the account that is given under the article CARBONAT of Potash, of the various methods by which this substance

POTASH.

is obtained, we shall here subjoin some further particulars. Mr. Birch, who some years ago carried on an extensive manufactory near Manchester, and who bleached his own yarn, was induced to try whether the dunghill-water might not be converted into potashes. He accordingly evaporated a large quantity of it, and burnt the residuum in an oven; the event so far answered his expectations, that he ever since continued to prepare these ashes, and to employ them in the operation of bucking: and with a liberality which betokens true greatness of mind, he made this lucrative discovery public.

The process is extremely simple, and may be easily understood by viewing *Plate XXIV. Miscellany, fig. 6*, in which N^o 1 represents the dunghill; 2, a fough or drain round it; 3, a reservoir for the dunghill-water; 4, a well communicating with the reservoir, in which a pump is fixed, to convey it to N^o 7, which is a pan, in which the water is boiled to the consistence of treacle, and afterwards burnt in an oven. The pan is made of iron plates, turned up a little at the edges. To these are screwed planks of wood, in order to make it about twenty inches deep. From a quantity of muck-water, equal to twenty-four wine pipes full, the quantity of ashes made was 9 cwt. 1 qr. 12 lb. valued at two guineas *per* hundred; in the manufacture of which, allowing for every expence attending it, there is a clear profit of 15*l.* 4*s.* deducting a trifle for the wear of the pan and oven. Dr. Percival suggests, that this profit, considerable as it is, may admit of increase by future improvements: for in spring and summer seasons, the evaporation might be carried on without the aid of fire, by conveying the dunghill-water from the reservoir through proper sluices into shallow troughs or ponds, of such extent as to afford a sufficient surface for the action of the sun and wind. These might be covered in rainy weather with awnings of canvas painted on the outside black, and white on the inside; the former with a view to absorb, the latter to reflect, the rays of light.

From the experiments of Dr. Percival, it appears that this potash is of a greyish-white appearance, deliquesces a little in moist air; but if kept in a dry room, near the fire, acquires a powdery surface. It is hard, and of a spongy texture when broken, with many small crystals in its substance. The colour of its internal part is dusky and variegated. To the taste it is acrid, saline, and sulphureous. It emits no smell of volatile alkali, either in a solid form, dissolved, or when added to lime-water; neither does it communicate the sapphire colour to a solution of blue vitriol. Silver is quickly tinged black by it, a proof that it contains much phlogiston. Ten grains of this potash required eleven drops of the weak spirit of vitriol to saturate them. The like quantity of salt of tartar required, of the same acid, twenty-four drops: a strong effervescence occurred in both mixtures; from the former a sulphureous vapour was exhaled. A tea spoonful of the syrup of violets, diluted with an ounce of water, was changed into a bright green colour by five grains of the salt of tartar; but ten grains of this potash were necessary to produce the same hue, in a similar mixture. Half an ounce of the potash dissolved entirely in half a pint of hot water; but when the liquor was cold, a large purple sediment subsided to the bottom: and it was found that this sediment amounted to about two-thirds of the whole quantity of ashes used.

The same ingenious writer concludes with observing, that this potash is a true fixed vegetable alkali, produced by putrefaction; that the quantity of alkali contained in it may be estimated at one-third of its weight, whereas the white Muscovy ashes are said to yield only one-eighth

part; that no quick-lime appears to be contained in this potash, for a solution of it poured from its sediment, remained clear, though long exposed to the air: that it would be worth trying, whether the large purple sediment, which subsides when this potash is lixiviated, might not be applied to the manufacture of Prussian blue, or used in the manner recommended by Macquer for dyeing wool and silks; and that this manufacture will furnish the farmer for top-dressing for his garden and land, of great fertilizing powers.

Dr. Watson (the present bishop of Landaff) suggests, that the investigation of a method of extracting its alkaline part from rock-salt, would be a most serviceable discovery. We have inexhaustible mines of rock-salt in this country, which, (he observes) the proprietors can afford at ten shillings a ton. A ton of rock-salt contains about half a ton of mineral alkali, which is for most purposes far preferable to potash. To those who have leisure to attempt such a discovery, he gives the following hint: whether the alkaline part of rock-salt may not be obtained by calcining it in conjunction with charcoal in open fires? His reason for this conjecture is founded upon the following experiment: upon burning sea-wrack to a black coal, and stopping the process at that point, he has obtained great plenty of common salt, but no mineral alkali from the black ashes; though we are certain, that when the black ashes are thoroughly calcined, or reduced to white ashes, mineral alkali may be obtained from them. This makes it probable, that the common salt contained in the black ashes of sea-wrack is decomposed, and changed into a mineral alkali, during the burning of the black ashes. There are reasons to suppose, that the cinder of pit-coal would answer the purpose better than charcoal. *Chem. Ess. vol. i. p. 136, &c.*

POTASH, in *Agriculture*, as a manure, is beneficial in some cases of grass land. It is stated that, in the county of Essex, Mr. Tweed, at Sandon, has a potash fabric on his farm; the value of the ashes *6d. per* bushel. He spreads on his grass-lands 160 bushels to the acre, once in five years. It more than doubles the produce. And Mr. Vaizey, of Halstead, in the same county, has manufactured it largely. When he uses the ashes alone, he also spreads 160 bushels, or thereabouts, on the acre; but he prefers mixing them with his yard-dung. Mr. Porter, of Little Leighs, in that district, has likewise remarked that these ashes sink *like quicksilver*, as readily as clay: shallow tillage is, therefore, good after them.

Other sorts of ashes are also frequently employed in this tract of country. At Chesterford, many coal-ashes are brought from Cambridge, at the distance of eleven miles, for clover, sainfoin, and grass: the price *2d.* a bushel, besides carriage. The Rev. Mr. Macklin uses a waggon-load to the acre. And lord Braybrook, at Audley-End, manures largely with these ashes; 38 acres of sainfoin in one year, 60 bushel to the acre, costing, carriage included, nearly *6d.* the bushel. His tenant and steward, Mr. Nockold, likewise manures ten acres of sainfoin with them every year. Another very spirited tenant and improver, Mr. Clayden, also laid down 50 acres to sainfoin; and in three months he brought from Cambridge 6200 bushels of these ashes, and in the same year dunged all his meadows besides. Such exertions are truly meritorious. These ashes are constantly attended with the best effects in this application. *Corrected Agricultural Report.*

In the county of Sussex, too, they have found this sort of ashes a great improvement to grass. Lord Egremont has doubled the value of his park, by draining and these
coal-

coal-ashes, which before was covered with moss, rushes, and rubbish. The difference of the grass, where the land has been covered with ashes, and where it has not, is most striking. They have created a sweet bite of white clover and trefoil, liked much by sheep. Corrected Agricultural Report. See MANURE and TURF-Ashes.

POTASSÆ *impura carbonas*, called also *Cineres clavelati*, and *kali impurum*, impure potash, carbonate of potash, potashes, and pearl-ashes, in the *Materia Medica* and the *Arts*, enters under a variety of forms into preparations for medicinal use, and for many mechanical purposes.

As to the origin of that fixed vegetable alkali called potash, it is disputed whether it exists ready formed in vegetables previously to their combustion, by which it is obtained, but which only disengages substances which envelope and disguise it; or whether vegetables contain only the materials proper for its formation, which consequently takes place in the act of burning, and whether it be, properly speaking, produced by fire.

The author of the Chemical Dictionary, art. ALKALI, *fixed vegetable*, says, that the reasons for and against these two opinions are so strong on both sides, that there are grounds to believe both of them to be true; or, that the fixed alkali, obtained after burning a vegetable, did partly exist ready formed in that vegetable before it was burnt, and that the other part was produced by the very act of combustion. The alkali prepared by the incineration of vegetable substances, and by lixiviating and evaporating to dryness, is far from possessing that degree of purity, which is always requisite in exact chemical experiments. It is almost always altered, 1. By some remaining inflammable principle,

from which it may be purified either by calcination or applying to it a body on which it cannot act, and which has a stronger affinity than itself with this inflammable matter: 2. By a portion of super-abundant earth, which may be easily separated from it by drying it once or twice, by solutions and filtrations; 3. By the mixture of different saline matters, which can be separated by no chemical process but crystallization: 4. By mixture with iron, for purifying it from which no practical method is known.

Besides referring to the preceding articles POTASH, CARBONAT of Potash, and PEARL-ASH, we shall select some other specimens of its combination.

It has accordingly been supposed that in living plants, the base only of potash exists as an element, and is oxydized so as to form the alkali during the combustion. Such is the conjecture of Mr. Murray (Chem. ii. 193.), and this may take place during the spontaneous decomposition of plants, where much water is present, for potash can be obtained, as we have already stated, by the evaporation of dunghill-water.

The pearl-ash of commerce is a very compound mass, containing, besides the sub-carbonate of potash, sand, sulphate of potash, muriate of potash, oxyd of iron, and oxyd of manganese, to the last of which Scheele attributes its blueish or greenish colour. Different parcels of pearl-ash must undoubtedly contain different quantities of potash; and, therefore, no accurate standard of the proportion of the ingredients can be fixed. M. Vauquelin has examined samples from different countries, and the result is exhibited in the following table.

N.B. The quantity of each was 1152 parts. *Annal. de Chimie*, xi. 284.

Kinds of Potash.	Real Potash.	Sulphate of Potash.	Muriate of Potash.	Insoluble Residue.	Carbonic Acid and Water.
Russian Potash -	772	65	5	56	254 = 1152
American Potash -	857	154	20	2	119 = 1152
Pearl-ash -	754	80	4	6	308 = 1152
Potash of Treves -	72	165	44	24	199 = 1152
Dantzic Potash -	603	152	14	79	304 = 1152
Potash of Vosges -	444	148	510	34	304 = 1152

The proportion of real alkali in any quantity of pearl-ash, may be ascertained in the following manner: pulverize 500 grains of the pearl-ash, and digest in successive portions of hot water, as long as any thing is dissolved. Mix the solutions, and drop in some diluted sulphuric acid, (previously prepared by mixing one part of concentrated acid with thrice its bulk of water), from a phial containing a known quantity of it, until litmus paper indicates the slightest possible excess of acid. Then heat this mixture to expel the carbonic acid; and on trying it again with the litmus paper, if it shew any excess of alkali, add a few drops more of acid. Ascertain now, by weighing the phial of acid, how much acid has been expended in saturating the alkali; and for every 100 parts of real acid set down 121.2 of pure potash. The value of the diluted acid must be previously ascertained, (see Aikin's Dict. i. 263.) by adding to 100 grains of it muriate of barytes as long as any precipitate falls. This forms sulphate of barytes, which, when washed and dried

at a low red heat, contains 83.3 per cent. of sulphuric acid; by which the proportion of real acid in the diluted acid may be known. See PEARL-Ash.

POTASSÆ *Acetas*, *Acetate of potash*, is prepared, according to the directions of the London pharmacopeia, by mixing together in a large glass vessel, 1½ lb. of subcarbonate of potash, and a gallon of (diluted) acetic acid; and having evaporated the solution to one-half over the fire, add gradually as much more (diluted) acetic acid as may be required for perfect saturation. Let the solution be again evaporated to one-half, and strained; then let the evaporation be continued in a water-bath, so that, on being removed from the fire, crystals shall form.

The *Acetis potassæ*, or acetite of potash, of the Edinburgh pharmacopeia, is obtained by the following process: take of pure carbonate of potash, 1 lb.; boil it with a very gentle heat, in four or five times its weight of distilled acetic acid; and add more acid at different times, until the watery

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part of the former portion, being nearly dissipated by evaporation, the acid newly added occasions no effervescence, which will be the case when about 20 lbs. of acid have been consumed; then evaporated slowly to dryness. Liquefy the remaining impure salt with a gentle heat for a short time; then let it be dissolved in water, and filtered through paper. If the liquefaction has been properly performed, the filtered fluid will be limpid; but otherwise, of a brown colour. Afterwards evaporate this fluid in a shallow glass vessel, with a very gentle heat, occasionally stirring the salt as it concretes, that it may the more quickly be brought to dryness. Finally, the acetite of potash ought to be preserved in closely shut vessels, to prevent its being liquefied by the air. This salt was first clearly described by Raymond Lully, and has at different periods assumed the following different names; "arcanum tartari, secret foliated earth of tartar, essential salt of wine, regenerated tartar, diuretic salt, digestive salt of Sylvius, and acetated kali."

It has a slight peculiar odour, and a warm sharp taste. It is usually in white masses, of a foliated soft texture, and becomes soon moist when exposed to the air: one fluid-ounce of distilled water at 60° dissolves 504 grains; or 100 parts of it are soluble in 105 parts of water, and in twice its weight of alcohol. In the watery solution it is spontaneously decomposed; and it is also decomposed by the strong acids, by a decoction of tamarinds, the sulphates of soda and of magnesia, the muriate of ammonia, the tartrate of potash and soda; and also by solutions of oxymuriate of mercury, and of the nitrate of silver; and consequently these cannot enter into formulæ with it. According to the experiments of Dr. Higgins, its constituents are 38.5 of acid, and 61.5 of alkali, in 100 parts. In medical use, acetate of potash is mildly cathartic and diuretic; and is found to be occasionally beneficial in febrile affections and jaundice; but it is principally employed in dropsies and other diseases, in which a copious discharge of urine is required. For producing the latter effect, the dose may be from ℥j to ʒj, given every three or four hours, in any bland fluid. Doses of ʒjj or ʒjjj open the bowels.

POTASSÆ Carbonas. See CARBONAT of Potash.

POTASSÆ Liquor, solution of potash. See LIXIVIUM. See also ALKALI and CAUSTIC.

The *lixivium causticum*, caustic ley, is described in the Edinb. phar. under the denomination of *aqua potassæ*, and in the Dublin phar. under that of *aqua kali caustica*, water of caustic kali. This solution of potash, prepared according to the formulæ of the pharmacopeias, is not simple, but contains small portions of muriate and sulphate of potash, silica, and generally some lime; however, these contaminations do not alter its effects as a remedy, nor as a pharmaceutical agent. This solution is diuretic, antacid, and lithontriptic. As a solvent of calculus, both in the kidneys and bladder, this alkali has been long celebrated; it has been observed, however, that it acts only on calculi composed of uric acid, or of urate of ammonia; and there is reason to believe, that its solvent effects on these calculi in the bladder are not equivalent to the irritation it excites both in the stomach and bladder: as a prophylactic its place can be better supplied by magnesia and the alkaline carbonates. Dr. Willan has perceived that the internal use of this solution produced the most beneficial effects in lepra. It is also used as a local stimulant, much diluted, in the form of lotion, to the joints, in rachitis and gouty swellings; and in its concentrated state as a caustic, to destroy the poison introduced by the bite of rabid or venomous animals. The dose may be from ℥x to ʒʒ, taken in chicken-

broth, milk, or almond mixture; or in cases of acidity of the stomach, in some bitter infusion.

POTASSA Fusa, or fused potash, of the Lond. phar. is prepared by taking a gallon of solution of potash, and evaporating the water in a clean iron vessel over the fire, until the ebullition having ceased the potash melts, and then pouring it out upon a clean iron plate into proper forms. This preparation of potash was formerly called *causticum commune acerrimum*, or stronger common caustic: it is in the Edinb. phar. described under the name of *potassa*, and in the Dublin phar. under that of *kali causticum*. In order to procure it as free as possible from carbonic acid, the evaporation should be performed very quickly, and in a deep vessel, so that the watery vapour which rises may exclude the atmospheric air. It is generally run into moulds, which form it into solid cylinders, which are covered with paper, and kept in well-stopped bottles. Berthollet's method of obtaining it in perfect purity is described under the article POTASH; but the following process of Lowitz is said to be more economical. Evaporate a solution of potash until a pellicle forms on its surface, and then let it cool; and carefully separate the saline deposit. Renew the evaporation, skimming off the pellicles that form on the surface, and as soon as they cease to be formed, and the ebullition is ended, let it be removed from the fire, and constantly stirred till it is cold. The mass is then to be dissolved in twice its weight of distilled cold water, the solution filtered, and evaporated in a clean iron or silver basin (a glass retort would be dissolved by pure potash, when hot) until crystals are deposited. If the heated fluid consolidates into a mass, in any degree, a small portion of water must be added, and the mass again heated to fluidity. The supernatant liquor is left of a brown colour, which, after being kept for some time at rest in well-stopped phials, deposits the colouring matter, and may be again evaporated and crystallized as before. The crystals obtained in the various evaporations are colourless pure potash. (See Nicholson's Journ. 4to. vol. i. 164.) This concrete potash is a white brittle substance, having the peculiar odour of slaking quick-lime, and a degree of causticity which will not allow its being tasted. It attracts water rapidly from the atmosphere, and is completely soluble in less than its own weight of that fluid at 60°. When heated to 360° it melts, and at a red heat is volatilized. It unites with sulphur, the acids, many of the metallic oxyds, and the fixed oils. Its constituents, according to the analysis of Sir H. Davy (Elem. of Chem. Phil.), are in 100 parts, 83 of potassium and 17 of oxygen. See POTASH, supra, and POTASSIUM.

This substance is used only as an escharotic, for forming issues in diseases of the hip-joint, the spine, and deep-seated inflammations. It has been lately much recommended for the removal of strictures of the urethra.

POTASSA cum Calce, potash with lime, is formed, according to the Lond. phar. by taking three pints of solution of potash and a pound of fresh burnt lime. Boil the solution down to a pint, then add the lime previously slaked by the water, and intimately mix them. This was the former *causticum commune mitius*, or milder common caustic; it is the caustic kali with lime of the Dublin college. The addition of the lime in these preparations makes the potash less deliquescent, and consequently more manageable as an escharotic.

POTASSÆ Nitras, nitrat of potash, nitre, or saltpetre, is a neutral salt, composed of nitric acid and potash in a state of perfect mutual saturation. The most usual form which this salt assumes is that of the common quartz crystal, or that of a straight six-sided prism, terminated at each extremity by a six-sided prism. Its specific gravity, according

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to Newton, is 1.9, according to Muschenbroek 1.901, and according to Hassenfratz, 1.9369, which latter is said to be the least correct. Nitre, when fully crystallized, is very brittle; and if the large prismatic crystals are held in the warm hand, they will crack transversely with a very audible noise. The moisture which it generally attracts on being exposed to the air is probably owing to the casual mixture of a small portion of deliquescent salt. Some differences of opinion subsist with regard to the solubility of nitre in water of different temperature. According to Bergman, this salt is soluble in seven times its weight of water at the usual temperature, and in about its own weight of boiling water; but from the experiments of Hassenfratz it appears, that a hot saturated solution of nitre, after being cooled down to 61° Fahr., and remaining at this temperature 24 hours, holds nearly a fourth of its weight of salt, and at 54° Fahr. about a sixth of its weight. According to Beaumé, 4 oz. of boiling water will take up 10 oz. of nitre when the solution is made in a matras, but if a basin or other open vessel be used, a pellicle begins to form at the surface of the liquor, when it contains water and salt in equal proportions. Hassenfratz has constructed the following table of the specific gravity and composition of solutions of nitre in water at 61° Fahrenheit.

Sp. gr. of Solution at 61° Fahr.	Proportion of Nitre in 100 parts of Solution.
1.006	1
1.012	2
1.018	3
1.024	4
1.030	5
1.035	6
1.040	7
1.046	8
1.053	9
1.059	10
1.065	11
1.072	12
1.078	13
1.085	14
1.091	15
1.098	16
1.105	17
1.111	18
1.118	19
1.125	20
1.132	21
1.138	22
1.145	23
1.152	24
1.158	25

Ann. Chim. xvii. p. 135.

Nitre is easily fusible at a heat almost equal to that of melting zinc, or somewhat below that of ignition, and at this temperature it undergoes no change except a slight loss of weight by parting with its water of crystallization; and a piece of charcoal may be immersed in it without producing any detonation. Poured on any flat surface it presently congeals into a white translucent mass, commonly known by the name of "crystal mineral." (See CRYSTAL.) But with a heat more than sufficient to maintain its liquidity, a decomposition commences; bubbles of gas are disengaged; and if the heat be continued as long as any air escapes, the acid is entirely decomposed, and nothing remains but the alkaline base of the salt: the gas that first comes over dur-

ing the process is tolerably pure oxygen, but the latter portions are largely mixed with azot. When the fusion is not continued long enough for the total decomposition of the nitre, the residue consists of free alkali, and a variable proportion of nitrite of potash.

The decomposition of nitre is more rapid, if some inflammable substance be present; in this case a detonation of nitre takes place; the added inflammable matter combines with the greater part of the oxygen of the nitric acid, and is converted into an oxyd or acid; if the latter, it generally unites with the alkaline base of the nitre in proportion as its own acid is decomposed or driven off. Accordingly, if a few grains of sulphur be projected on red-hot nitre, the former immediately takes fire, burns rapidly with a reddish-purple flame, and is converted into sulphuric and sulphureous acid, at the expense of the nitrous acid, which is more or less decomposed: the sulphureous acid mixed with nitrous vapour flies off, while the sulphuric acid remains in combination with the disengaged potash of the nitre, forming "sulphat of potash." When the quantity of sulphur added is not sufficient to effect a total decomposition of the nitre, the result is a mixture of the two neutral salts, and was known among the old chemists by the name of "Glafer's polychrest salt."

The detonation of nitre with charcoal is very rapid; whether the charcoal is added to the nitre brought previously to a state of fusion, or the two ingredients are mixed together by pulverization, and then thrown into a crucible, or any other vessel heated red-hot, an intense blue flame is disengaged, accompanied by a great heat and a white vapour, the nitric acid disappears, and the residual salt is "subcarbonate of potash." In this case, the charcoal combines with the oxygen of the nitric acid, and is converted into carbonic acid, a portion of which unites with the alkaline base of the nitre, whereby the rest is volatilized, together with the azot produced by the decomposition of the nitric acid. Sir H. Davy's experiments, detailed in his "Researches," throw farther light on this subject. Having filled a glass tube with a mixture composed of six parts of nitre and one of charcoal, he detonated it, and received the product into a jar inverted over mercury, and containing a little water; which, after the operation, was so much acidulated as to restore the colour of red cabbage juice that had been rendered green by an alkali, thus indicating the presence of a little nitrous acid; but the same liquor, when supersaturated by caustic potash or quick-lime, gave out a very sensible odour of volatile alkali, so that it appears to have contained acidulous nitrate of ammonia. The gas produced by the detonation being mixed with the carbonic acid, separated by muriatic acid from the alkaline residue, was found to be composed of carbonic acid, nitrous gas, and azot, in the proportion, by bulk, of twenty of the first, three of the second, and seven of the third. The presence of ammonia in this experiment is attributed by Mr. Aikin to the decomposition of the water of crystallization by the charcoal, and the combination of its hydrogenous base with the azot of the nitric acid.

Those compound acids into which carbon enters as an essential constituent, decompose nitre with nearly the same energy as charcoal does: thus, if equal parts of nitre and crude tartar are mixed together and ignited, a detonation takes place; the tartareous and nitric acids mutually decompose each other into carbonic acid, and other gaseous products, and there remains sub-carbonate of potash, being the alkaline base of both salts. Among the old chemists this alkali was much esteemed, and by them it was named

"white

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“white flux,” “extemporaneous alkali,” and “nitre fixed by tartar:” but it is not in any respect different from purified pearl-ash, if the nitre has been all decomposed.

Most of the metals, as Aikin observes, if reduced to filings or powder, and mixed with nitre, will produce a detonation at a red heat; the metal in a state of high oxydation unites with the alkali, and the nitric acid is more or less completely decomposed. The most inflammable metals, such as zinc, antimony, tin, iron, and bismuth, produce the most violent detonation. The effect of pure hydrogen on nitre has not been examined; but those readily-fusible inflammable bodies, into the composition of which it largely enters, are not capable of detonating with nitre, except in exact proportion to the amount of carbon which they contain beyond what is requisite for the production of carburetted hydrogen; or as Macquer, who made the discovery, states it, no detonation will happen till the inflammable matter be burnt and reduced to a coal; then the detonation commences, and is always proportionable to the quantity of coal produced by the inflammable matter.

Nitre is entirely decomposed by distillation at a moderate heat with sulphuric acid, and at a higher temperature with phosphoric, boracic, and arsenic acids. These combine with the alkali of the salt, while its acid passes over in the state of vapour. A similar effect is produced by flint or alumine, or a mixture of both; but the heat requisite in this case being considerably higher than in the former, a proportionably larger quantity of nitric acid is decomposed during the process. Strong muriatic acid will also in part decompose nitre. The only substance capable of decomposing nitre, so as to liberate its alkali, is caustic barytes; a quantity of each in fine powder being mixed together, and then moistened with a little water, re-act on each other, and produce nitrate of barytes and caustic potash, of which the latter alone (if too much water is not used) remains in solution.

The exact analysis of nitre is difficult, and hence the most able chemists have varied in their statements of its composition. Bergman found that 49 parts of potash, when saturated with nitric acid, afforded 100 of crystallized nitre; and accordingly he gives the proportions of this salt at

49 potash
33 nitric acid
18 water

100

According to Wenzel, 100 parts of nitre contain

48.13 potash
51.87 acid and water

100.00

But according to Kirwan, 100 parts of crystallized nitre, dried at 70° Fahr., are composed of

51.8 potash
44.0 acid
4.2 water

100.0

And as this estimate is incidentally confirmed by other experiments of Berthollet and of Keir, it is probably, says Mr. Aikin, very near the truth. Macquer's Chem. Dict. Aikin's Dict. of Chem. and Min., to which we are chiefly indebted in the compilation of the preceding article.

For the natural history and manufacture of nitre, and its various uses in the arts, we refer to the article SALTPETRE.

As to its medical properties and uses, it is considered as refrigerant and diuretic; and externally applied, it is cooling and detergent. When taken in repeated small doses, it abates heat and thirst in diseases of increased excitement, diminishes the force and frequency of the arterial action, and increases the secretion of urine, in which the salt may be detected by chemical tests. It is efficaciously given in all inflammatory cases, active hæmorrhages, and in herpetic eruptions. Although diuretic, it is of little use in dropsies, and is contraindicated in typhus and hectic fevers; in the latter of which, as Dr. Percival has justly observed, it lowers the pulse at first, but afterwards raises it higher than before. A small portion of it allowed to dissolve slowly in the mouth often removes incipient inflammatory sore throat; and hence its utility in gargles for that complaint. It is most advantageously given dissolved in mucilaginous fluids, as almond emulsion, in moderate doses not exceeding grs. xv, frequently repeated. In large doses it excites nausea; and ʒj given for a dose, which has sometimes occurred for sulphate of soda, occasions vomiting, hypercatharsis, bloody stools, convulsions, and sometimes death. Opium and aromatics are the best antidotes. Thomson's Lond. Disp.

POTASSÆ *Subcarbonas*, subcarbonate of potash, is prepared, according to the directions of the London pharmacopœia, in the following manner: take of impure potash (pearl-ashes) reduced to powder, 3 lb.; and boiling water, 3½ pints. Dissolve the potash in the water, and filter; then pour the solution into a clean iron pot, and evaporate the water with a gentle heat until the liquor thickens; then withdraw the fire, and stir assiduously with an iron spatula, until the salt concretes into small grains. A pure subcarbonate of potash may be prepared in a similar manner from tartar, previously burnt till it is of an ash-colour. (See CARBONAT of Potash, and TARTAR.) Its constituents, according to Berard, are 29.79 acid, and 70.21 alkali and water, in 100 parts. (Annal. de Chim. lxxi. 55.) As an article of the Materia Medica, it is deobstruent, diuretic, and antacid. In small doses, it is sometimes given in cases of glandular obstructions of the abdominal viscera, particularly hepatic obstructions, with seeming advantage; but it is not certain, that the benefit does not arise from the effects of the remedy in correcting acidity of the primæ viæ. Its effects on the kidneys are considerable, when aided by plentiful dilution. The principal use of this salt in medicine is in the formation of saline draughts, for which purpose it is given in combination with a solution of citric acid, or with recent lemon juice, in the proportion of ʒj of the salt to fʒiv of the lemon juice, or the acid solution, in febrile affections: when given as an antacid, its taste and acrimony are most perfectly covered with milk.

POTASSÆ *Sub-carbonatis, liquor*, a solution of subcarbonate of potash, is prepared by dissolving 1 lb. of subcarbonate of potash in 12 fluid-ounces of distilled water, and filtering the solution through paper: Lond. pharm. The medical properties and uses of this solution are the same with those of the concrete salt. The dose may be from ℞ to fʒi, in any convenient vehicle.

POTASSÆ *Sulphas*. See SULPHAT of Potash.

POTASSÆ *Sulphas cum Sulphure*, formerly Polychrest salt. See SULPHAT, &c.

POTASSÆ *Sulphites*. See SULPHITE of Potash.

POTASSÆ *Sulphuretum*. See SULPHURET of Potash.

POTASSÆ *Superfulphas*, formerly *Sal enixum*. See SUPER-SULPHATE.

POTASSÆ *Supertartras*, and *Supertartris*. See TARTRITES.

POTASSÆ *Tartras* and *Tartris*. See TARTAR and TARTRITES.

POTASSIUM, or basis of potash. The splendid discovery which brought to light this extraordinary substance, is so much connected with the history and progress of electro-chemistry, that it is impossible to enter into the former subject without, in some degree, encroaching upon the latter.

Immediately after the discovery of Volta's pile, philosophers began to make some observations respecting its agency in producing chemical effects. Messrs. Carlisle and Nicholson, and Mr. Cruickshank, were the first chemists who turned their attention to the subject. On the continent, Messrs. Fourcroy, Vauquelin, Thenard, Ritter, Berzelius, and Volta himself, followed up the inquiry, and many interesting facts on the chemical effects of electricity were soon established. It was by the British chemists just mentioned, however, that the important fact of the decomposition of water by electricity was first discovered. Mr. Nicholson shewed, that by introducing wires, connected with the two extremities of the Volta pile, into a tube filled with water, a stream of hydrogen gas arose from the wire connected with the negative pole, and the wire connected with the other pole became oxydated; but when the latter was of a metal not susceptible of oxydation, oxygen issued from it.

It is about this period (in 1806) one of the most memorable in the annals of natural philosophy, that sir H. Davy began his researches. He had no sooner turned his fertile genius to this inquiry, than a number of new and interesting facts were added to this department of science. He shewed in particular, that whenever a saline substance is exposed to the action of the Volta pile, it is invariably decomposed, the alkali being attracted towards the negative pole, and the acid towards the positive.

Similar experiments were instituted upon a variety of substances, and a sufficient number of facts were obtained to enable sir H. Davy to conclude, in general, that hydrogen, the alkaline substances, the metals, and certain metallic oxyds, are attracted by negatively electrified metallic surfaces, and repelled by positively electrified metallic surfaces; whilst oxygen and acid bodies are attracted by positively electrified metallic surfaces, and repelled by negatively electrified metallic surfaces; the electrical attractions and repulsions thus affording a new and powerful means of chemical decomposition.

These were the important results which sir H. Davy laid before the public in 1806. For some time the philosophical world waited in silence; and although Davy had advanced in his first paper the conjecture that many bodies, hitherto considered as simple, might probably be decomposed by electricity, no one ventured to take up the subject; and it was not until a twelvemonth afterwards that Davy himself resumed his researches, and obtained those results which placed him amongst the first discoverers of the age. The fixed alkalies were the bodies to which he first directed his attention; and, after a few days' labour, he was able to demonstrate that the alkalies are compound bodies, and that they consist of a new and highly curious metallic substance, combined with oxygen. His first experiments, which were upon potash, are thus related in his own words. Phil. Trans. 1807.

"A small piece of pure potash, which had been exposed for a few seconds to the moisture of the atmosphere, so as to give conducting power to the surface, was placed upon

an insulated disk of platina, connected with the negative side of the battery in a state of intense activity; and a platina wire, communicating with the positive side, was brought in contact with the upper surface of the alkali. The whole apparatus was in the open atmosphere.

"Under these circumstances, a vivid action was soon observed to take place. The potash began to fuse at both its points of electrization. There was a violent effervescence at the upper surface; at the lower, or negative surface, there was no liberation of elastic fluid; but small globules having a high metallic lustre, and being perfectly similar in external appearance to quicksilver, appeared, some of which burnt with explosion and bright flame, and others remained, and were merely tarnished, and finally covered by a white film which formed on their surface."

"These globules," continues Davy, "numerous experiments shewed to be the substance I was in search of, and a peculiar inflammable principle, the basis of potash."

It is to this metallic substance that the illustrious discoverer has given the name of *Potassium*, and it now remains for us to describe its properties, which we shall do nearly in sir H. Davy's own words. See Davy's Elements of Chemical Philosophy.

Potassium is lighter than water; its specific gravity is between 8 and 9, water being 10. It is a solid at common temperatures; it is very soft, and easily moulded by the fingers. It fuses at about 150° Fahrenheit, and rises in vapour in a heat a little below that of redness. It is perfectly opaque. Its colour is white, like that of silver when it is newly cut, but it rapidly tarnishes in the air; and to be preserved from change must be kept under naphtha. It is a conductor of electricity. When thrown upon water it acts with great violence, swims upon the surface, and burns with a beautiful light, which is white, mixed with red and violet; the water in which it burns is found alkaline, and contains a solution of potash. It inflames when gently heated in the air, burns with a red light, and throws off fumes, which are alkaline. It burns spontaneously in chlorine, or oxymuriatic acid gas, with intense brilliancy. It acts with energy upon all fluid bodies containing oxygen or water; and in attracting oxygen from water, it disengages hydrogen.

Potassium combines with oxygen in different proportions; if gently heated in common air, or in oxygen, the result of its combustion is an orange-coloured fusible substance, which, as Messrs. Gay Lussac and Thenard have shewn, is an oxyd of potassium, containing a larger proportion of oxygen than that which constitutes potash. When thrown into water, this oxyd effervesces, and oxygen is disengaged. If heated strongly upon platina, oxygen is expelled from it, and pure potash remains, which dissolves in water without effervescence, but with much heat. This oxyd of potassium is not to be confounded with pure potash, dried by mere ignition, since, as was observed in the article POTASH, the latter never contains less than 17 or 18 per cent. of water.

The inflammation produced when thin pieces of potassium are introduced into chlorine, is very vivid. The attraction of chlorine for potassium is much stronger than that of oxygen; so that potash and the orange oxyd of potassium are immediately decomposed by chlorine, the chlorine combining with the metal, and the oxygen being set free.

The result of the combination of chlorine and potassium is the substance called muriate of potash, a nomenclature to which sir H. Davy strongly objects; since, according to his view of the subject, this compound contains neither muriatic acid nor potash, but potassium and chlorine. As, however, some of the most eminent chemical philosophers

of the age still entertain great doubts respecting the accuracy of sir H. Davy's views in regard to the nature of oxymuriatic acid, this part of the subject may be considered as still *sub judice*; and until the point is proved or controverted by more decisive arguments, it would be better to postpone the proposed changes of nomenclature.

Potassium and sulphur combine with great energy when they are heated together, producing much heat and light, and forming a *sulphuret of potassium*, which is of a grey colour, and appears to consist of 30 parts of sulphur to 75 of potassium.

A *phosphuret of potassium* may be produced in a similar manner, which burns with great brilliancy when exposed to air, and when thrown into water produces explosions, with disengagement of phosphuretted hydrogen.

From the excessive attraction which potassium has for oxygen, it may be used as a general agent for detecting the presence of that principle in bodies; and a number of substances, undecomposable by other chemical agents, are readily decomposed by this body.

Such are the principal circumstances relating to the history of this extraordinary substance. It will be seen under the article SODIUM, how soda, the other fixed alkali, yielded to the same powers of chemical decomposition; so that this important class of bodies, the nature of which had evaded the researches of all former chemists, and was deemed an almost insoluble problem, suddenly yielded to a bold effort of British genius. Davy seized upon the powerful instrument which others had discovered, but which he knew best how to use and appreciate. With this wonderful agent he brought to light bodies which the human eye had never beheld, and which, without him, might have remained eternally concealed under their impenetrable disguise.

An important circumstance remains to be mentioned. When the bases of alkalies were discovered, it was thought that they could be obtained by means of the Voltaic electricity alone, and could be procured that way only in very minute quantities. But Messrs. Gay Lussac and Thénard discovered, in 1808, that potassium might be procured, by chemical means, without electricity. If iron turnings be heated to whiteness in a curved gun-barrel, (*Plate XXIV. Miscellany, fig. 7.*) and if melted potash be made slowly to come in contact with the turnings, air being excluded, potassium will be formed, and may be collected in a cold part of the tube. Potassium may in this way be now prepared in almost any quantities, and it is peculiarly satisfactory to observe, that when sir H. Davy's experiments could be repeated at pleasure upon a large scale, his conclusions were confirmed in all the important particulars.

POTATOE, in *Gardening*, a well-known, useful, and common root. See SOLANUM.

POTATOE, in *Agriculture*, the name of a well-known plant of the knobby-rooted kind, much used as human food in most places. It may be noticed, that the discovery of this inestimable root has been of the greatest consequence to mankind, as it is now almost generally cultivated, though at first its introduction was very much opposed. Mr. Donaldson says, that it may with the greatest propriety be denominated the *bread-root* of Great Britain and Ireland. It was first brought from Virginia by the memorable, but ill-fated, sir Walter Raleigh; who, on his return homeward, in the year 1623, stopping at Ireland, distributed a number of potatoes in that kingdom. These having been planted, multiplied accordingly; and in a few years, the cultivation of them became general. And they became soon of the greatest benefit to the people, in the scarcities of grain that have since occurred in that country, as well as in

this, especially in the last severe famine. They were brought from Ireland into Great Britain; and owing to a ship, loaded with potatoes, being wrecked on the coast of Lancashire, the cultivation of that root, in the field, was first generally established there. Further, that within these last fifty years, the culture of potatoes has been introduced and extended in every part of the kingdom; but it is now much more general in Scotland than in England, except in a very few counties.

During the great scarcity of grain which happened in the north of Scotland, in consequence of the failure of the crop of 1782, many thousands of the inhabitants must have been reduced to the greatest distress, but for the relief which potatoes afforded them. And although the crop of potatoes failed to a considerable degree in 1795, every one knows how much the miseries, consequent on so great a failure of the crop of grain as then happened, were alleviated, in consequence of this root being so generally cultivated, and in such abundance. The culture of a root so highly valuable as the food of man should, of course, be particularly attended to by the farmers in all places.

It is now well known that there are two general kinds of this plant, which are distinguished into the *red-rooted*, which has purple flowers, and the *white-rooted*, which has white flowers; but in raising the root from the seed, or apple, numerous varieties have been introduced, and are daily introducing themselves to the planter.

It is supposed by the writer just noticed, that great improvements may still be made, both in the quality and productiveness of this plant, by raising it from seed, as will be fully shewn below. It is obvious, therefore, from the mode of raising the plants by seed, that the varieties in cultivation must be extremely numerous, and be liable to continual change. The following sorts have been distinguished by an extensive cultivator in Lancashire, where this kind of culture is in general well managed.

Early Kinds.

Smooth yellows,	Mather's seedlings,
Red champions,	Kerkham marbles,
White ditto,	Donbobin's seedlings,
Lady queens,	Poor man's profit,
Drunken landlord,	Golden gulleons,
Birchal's golden yellows,	Invincible,
Smith's seedlings,	Broughton's dwarfs,
Foxe's ditto,	Hatley's nonsuch,
Boskow's kidneys,	Early perrins,
English champions,	Forcing dwarfs,
Britain's dwarfs,	Early manleys.
Bates's ditto,	

Late Kinds.

American white rangers,	Ox noble,
American red ditto,	Lords,
Derbyshire reds,	Seedling varieties,
Late champions,	Balmer's seedlings,
Late kidneys,	Budworth's dusters,
Pink eyes,	Irish apples,
Pink-nosed kidneys,	Winter kidneys.

There are also other varieties of the late sort.

White Scotch,	Common wise,
Magpie,	Apple,
Rough red,	Red sprout,
Purple,	Munster white,
English white,	Crons,
Silver skin,	Spanish.

These

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These last six were formerly much in cultivation in this district; but the pink eyes, champions, and duns, are now a great deal more in estimation.

But for use as human food, the old winter red has been found highly useful, as keeping well to a late period in the spring, when most other sorts are unfit for the table. As cattle potatoes, the ox noble and cluster sorts have been most commonly employed. The first, though formerly very productive, has lately been found to decline in some degree; it is, however, a good sort. The latter is also a very productive sort in this view. The royal, or Cumberland early, is likewise an useful sort, being both large in size, and more productive. A late writer states, that the pink eyes and copper plates are of a hardy nature, and probably capable of being grown with less perfect culture than most of the other varieties. The white and the apple sorts are only proper to be used in the early part of the season.

Various attempts have been made by different cultivators, to ascertain the difference of productiveness in the different sorts; but the matter has not yet been decided with any degree of accuracy. But in Mr. Young's trials under the drill system, the results were these:

Kinds.	Produce.
Cluster	360 bushels <i>per</i> acre
Red-nosed kidney	144
Golden tags	207

And with Mr. Baker in Ireland, the results, as stated in the report on potatoes, published by the Board of Agriculture, were these, on a similar space of ground:

Sorts.	Produce.
Common wife	21 lb. 6 oz.
Apple	20 2
Red French	15 12
Munster white	16 0
Crones	16 6
Spanish	15 10

But on repeating the experiment, they stood thus:

Sorts.	Produce.
Black	111 barrels <i>per</i> acre.
Quaker wife	108
Red French	88
White ditto	85
Common wife	103
Apple	76
English white	83
White Munster	79
Spanish	70
Crones	60

In Cheshire, there are different kinds of both the early and the late sorts made use of, in different parts. Among the early varieties, in the Frodsham district, they chiefly employ the Foxe's seedlings, and the perrins; but in the tract about Wirrall, the early manleys, Foxe's seedlings, and Broughton's dwarfs, none of which ever blossom; and in the Altringham range, the principal kinds are the Foxe and the green seedling. Some other early sorts are, however, occasionally had recourse to in these situations, though they are seldom such free bearers.

Among the later kinds, in the first of these districts, are the ox noble and the Irish apple, the kidney potatoe being now wholly given up here; in the second, the sorts commonly grown for winter use are the pink eyes, the ink eyes, the Scotch white, the ox noble, &c.; and in the last situa-

tion, the sorts mostly had recourse to are the white and red champions for the more early, and the dark coloured potatoe, called the sweep, for the later winter months.

About Ilford, in Essex, the favourite potatoe, for the general crop, was formerly the red-nosed kidney; but this is now much neglected, in consequence of its being almost sure to curl; and the champion very much preferred, as it does not curl.

Soil and Preparation.—In regard to soil, the potatoe will grow in almost any, even in that of the most indifferent quality; but that in which it thrives best, and where potatoes of the best quality are produced, is a light loam, neither too dry nor too moist; but if rich, so much the better. They may, however, be grown well on many other sorts of land, especially those of the mossy, moory, and other similar kinds, where they are free from stagnant moisture, and have had their parts well broken down by culture. And the differences in the produce, as depending on soil, are in some manner shewn below, in the result of Mr. Townley's trials, detailed in the report of potatoes by the Board of Agriculture; though the very stiff sorts of land do not seem to have been tried. The experiments were made by planting four eyes or buds of the cluster variety on four different descriptions of land.

Kinds of Soil.	Produce.
Strong rich loam	34 lb.
Light rich loam	29
Good gravel	19
Sand	15

From this it is evident, that though this sort of crop succeeds in the most perfect manner in the light friable sorts of soil, it does not answer on those of the purely sandy descriptions, as they are apt to become too dry in hot seasons, and to have too little of the earthy material in their composition. The wires of these roots have been found to shoot and extend, and the roots to distend themselves, and become of the largest sizes, in such soils as abound the most in good rich mellow mould. In cultivating this root in the field, it is of course of much advantage to have the land well broken down and divided by repeated ploughings and harrowings in the autumn and early spring months, being careful never to stir the land when it is wet. It may likewise be of utility in this view, to have recourse to the culture of this root, after such sorts of crops as have a tendency to loosen and render the land mellow and friable.

In Cheshire a considerable depth of dry, light, or loamy soil, is thought the most suitable to the cultivation of the potatoe, though other sorts of land may answer the purpose very well. But whatever is the nature of the soil, the ground should be well laid up in the autumn, to receive the beneficial action of the frosts, and in the spring be ploughed in a cross direction, torn well to pieces, and completely pulverized by the harrows; after which, about the end of April, or beginning of the following month, it is dunged and ploughed in a deep manner, into the form in which it is to be planted. In the Altringham district of this county, a dry sandy soil, and tolerably warm situation, is always preferred for the early sorts; but for the later kinds, a cooler bottom, if not clayey, is more generally chosen.

In Essex likewise, the potatoes are put into the ground after it has been prepared by an autumnal breaking up, and spring ploughings and harrowings for the most part two or three times.

However, where the practice of putting this sort of crop

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in upon fward or lay ground is employed, which by some is supposed advantageous, the best method of preparation is that of paring and burning, or the use of the skim-coulter plough, the dung and ashes being ploughed in together, in the first case by a light furrow. In the Survey of the North Riding of Yorkshire, the land intended for potatoes, if wheat, bean, or oat stubble, should, it is observed, be ploughed before Christmas, or as soon after it as possible, about the middle of April; if the land has got well dried, it should be harrowed well, repeating the operation, and also using the roller till the land is become fine. In a few days afterwards it should be ploughed again, being harrowed and rolled, as in the former case, and where the land is in a bad condition, it may be necessary to give it one or two ploughings more, with suitable harrowings and rollings, working it according to its particular state, letting it remain a few days between the ploughings; then it should be ridged up according to the state of the land in respect to fertility for being planted.

Manuring.—It is probable from the nature of this root, and the circumstance of its produce being formed in the soil, that it can never be cultivated to advantage without the use of manure. In some sorts of the more heavy kinds of land, such as is of the long littery kind may be made use of, as keeping such sorts of land more dry and open, but in those of the light, dry, friable kinds, the more reduced sort of manure may be better. Mr. Young considers farm-yard dung the best, and the more the better, unless the soil be very rich, and upon an average of soils, less should not be laid than twenty-five or thirty large loads to the acre, being spread equally that it may plough in well. But Mr. Billingsley, in his Survey of Somersetshire, supposes rotten horse dung as the best manure for this crop, after which he

advices hogs' dung, and then all sorts of farm-yard dung; but he observes, that lime, marle, soapers' ashes, and rags, make the potatoes scabby. In Lancashire, the good littery stable dung is mostly set apart for this crop. In an excellent report on the culture of the potatoe, presented to the public by the Board of Agriculture, the comparative advantages of different sorts of manure, have been in some measure shewn in different experiments as below.

Quantity of Manure *per Acre.*

	Crop: Bushels.
Exp. 1. 53 Loads (cubical yards) farm-yard dung	400
160 Bushels, foot	360
160 Ditto, wood-ashes	240
32 Loads of dung	280
42 Ditto	360
No manure	180
Exp. 2. 32 Loads of dung, and 40 bushels of wood-ashes	400
No manure	280
160 Bushels of flaked lime	380
1½ Ton of barley straw	300
340 Bushels of potash	380
32 Loads of dung	400
32 Ditto, and 160lb. salt added at time of spreading	400
32 Ditto, and 160 bushels of lime	480
32 Ditto, and 480 gallons urine	520

And the same thing has been attempted by Mr. A. Young, the results of which are these:

Manures.	First Year.	Second Year.
No. 1. No manure	produced 120 bushels <i>per acre</i> ,	140
2. Night-soil - 10 waggon loads	600	640
3. Ditto - 6 ditto	650	500
4. Ditto - 2 ditto	500	300
5. Bones - 10 ditto	650	640
6. Ditto - 6 ditto	640	560
7. Ditto, - 2 ditto	560	240
8. Hog dung - 60 one-horse cart-loads	480	300
9. Ditto - 30 ditto	480	160
10. Yard compost 60 ditto	300	240
11. Ditto - 120 ditto	480	300
12. Ditto - 30 ditto	140	140

In the trials of the Rev. Mr. Cartwright, made with a view of ascertaining the use of salt as a manure, with mixtures of twenty-five different substances, on a ferruginous sandy soil, enriched by pond mud in single rows, with the same number of sets in each, they are found productive in the following order.

Kinds of Substances.	Produce.
1. Salt and foot	240
2. Chandlers' graves	220
3. Salt and wood-ashes	217
4. Salt, gypsum-peat, lime	201
5. Salt, lime, dung	199
6. Salt	198
7. Salt, graves	195
8. Soot	192
9. Fresh dung	192

Kinds of Substances.	Produce.
10. Salt, malt-dust	189
11. Wood-ashes	187
12. Salt, decayed leaves	187
13. Salt, peat-ashes	185
14. Malt-dust	184
15. Salt, lime, peat	183
16. Salt, saw-dust	180
17. Salt, peat, bone-dust	178
18. Decayed leaves	175
19. Salt, lime, sulphuric acid	175
20. Salt, peat	171
21. Salt, lime	117
22. Peat	159
23. No manure	157
24. Saw-dust	155
25. Lime	150

And

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And with Mr. Townley in Lancashire, the manure being placed in furrows of five-foot ridges, the results stood in this way :

No.	Manures.	Produce.
1.	Coal-ashes only	produced 211lb., rather small.
2.	Stable dung and coal-ashes mixed	344 very fine.
3.	Stable dung alone	315 ditto.
4.	No manure	134 very small.
5.	Compost dung-lime, and soil	204 middling.
6.	Stable dung covered with common yellow mofs	438 remarkably fine.
7.	Soapers' waste	383 very fine.
8.	Stable dung and lime	268 tolerable.
9.	Lime alone	187 ditto.
10.	Coal-ashes and lime	19 ditto.
11.	Stable dung and soapers' waste	298 very good.
12.	Soot, foil, and coal-ashes	271 ditto.
13.	Salt and foil	200 ditto.
14.	Saw-duft and coal-ashes	190 smaller.
15.	Stable dung and saw-duft	307 very fine.
16.	Dung of poultry and coal-ashes	236 pretty fine.
17.	Dung of poultry and sand	156 rather small.
18.	Saw-duft and lime	197 ditto.
19.	Decayed rushes and lime	208 very good.
20.	Tanners' bark and lime	76 very poor.
21.	Bark and stable dung	141 rather larger.
22.	Bark alone	35 very poor.
23.	Stable dung and lime spread over the land	230 pretty fine.
24.	Chopped whins, with a covering of lime over them	256 very fine.

But in the culture of this kind of root on the heavier kinds of loamy lands, various sorts of littery materials have been made use of on the principle of preserving the soil in a more open and porous condition for the knobby roots to extend themselves. With this view, wheat-straw, stubble, furze, broom, heath, sea-weed, and other similar materials, have been made use of after being reduced by chopping, with good success, being laid in the bottom of the drills to be planted upon. Various kinds of luxuriant green vegetable crops have likewise been turned into the soil, and planted upon as a manure with success in some instances, where that substance could not be procured. And also substances of the peaty kind have been found advantageous in the same way, as well as in keeping the drier sorts of land in a better state of moisture, and those of the heavy sort in a more light and open state, and of course more free from stagnant moisture. Good rich mould and decayed leaves may be of use in cases where they can be had in sufficient quantity. All the trials that have been made with lime, seem to shew, that it has a tendency to induce the *curl* and *canker* in whatever state it is employed.

A curious practice in manuring for potatoes is had recourse to about Welton, in the county of Chester, which is situated close to the junction of the two rivers, the Mersey and the Weaver. Sea-mud is there made use of as manure for crops of this sort; twenty loads being the quantity usually laid upon the acre. The ground thus manured, not only, it is said, gives a large produce of potatoes, but is in a state of excellent preparation for a succeeding crop of either wheat or barley. And the adoption of this practice has increased very greatly the value of the land thereabouts.

The quantity of common manure which is used all about Frodsham for this crop, is various, from twenty to thirty tons to the acre. This is there procured at the rate of six or seven shillings the ton, and it is spread upon the land previously to the last ploughing. In all the other parts of this

district, they also constantly manure the land for the growth of this root, except in some particularly and naturally rich spots.

Near Ilford, in the county of Essex, as well as in most other parts, they manure their potatoe land by dunging in the spring, at the rate of about fourteen loads to the acre, which costs five shillings a load; they are spread upon the field just before the second ploughing, on which they plant.

In some parts of Lancashire, rape-duft is found a good manure for potatoes; but night-soil, both there and in Essex, makes them scabby.

But the ashes of burnt land are found highly beneficial in producing good crops of this root, which affords an opportunity of cultivating the coarse and waste sorts of grass land to much advantage, as by a crop or two of this sort they will mostly be in a condition to afford those of the grain kind.

Whatever sort of material may be made use of as a manure for this kind of crop, a sufficient proportion should always be employed to afford a due supply of nourishment to it while upon the ground. In the drill method of putting in crops of this kind, the manure is usually placed in the bottom of them in an even manner, but in the other methods, it is usually spread out evenly over the surface, and then turned down. It has been supposed by some, that for the early crops of this root, it is better to apply the manure to the crop that precedes them, as by that means the danger of their over-luxuriance may be prevented, and the crops be better in their quality. In general it is, however, the best practice to apply the manure to the crop.

The manner of placing the manure so as to afford the greatest advantage, has been a disputed point by different cultivators. The following experiments, made by a correct farmer, however, shew the propriety of placing it below the set, and not upon it, as is often done.

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Experiments made by Mr. Baker on Potatoes planted in an under-plantum of poor yellow Earth, April 27th and 29th, 1771, with the Rows 20 Inches asunder, and the Sets 12 Inches apart in the Rows, and 30 Sets in each Row.

Sorts.	Modes of planting.	Produce.							
		Merchantable.			Small.			Total.	
No.		No.	lb.	oz.	No.	lb.	oz.	lb.	oz.
1. Spanish.	} Over dung, chiefly neats dung.	91.	12	4	98.	3	6	15	10
2. Red French.		63.	13	8	51.	2	4	15	12
3. Common wife.		103.	16	2	86.	5	4	21	6
4. Cronos.		53.	12	4	60.	4	2	16	6
5. Munster white.		62.	12	8	59.	3	8	16	0
6. Apple.		50.	15	8	53.	4	10	20	2
Total		82 2			23 2			105 4	
7. Spanish.	} Under dung, chiefly neats.	54.	7	12	60.	3	8	11	4
8. Red French.		40.	9	0	60.	1	12	10	12
9. Common wife.		89.	15	2	84.	4	8	19	10
10. Cronos.		56.	9	12	44.	2	1	11	13
11. Munster white		54.	9	14	53.	3	8	13	6
12. Apple.		58.	14	14	40.	2	8	17	6
Total		66 6			17 13			84 3	
13. Spanish.	} Very small fingle eyes or sets under dung, chiefly neats.	47.	5	12	40.	2	8	8	4
14. Red French.		18.	4	8	45.	2	1	6	9
15. Common wife.		74.	13	8	49.	2	12	16	4
16. Cronos.		48.	9	0	50.	2	8	11	8
17. Munster white.		40.	6	8	27.	1	7	7	15
18. Apple.		40.	11	0	36.	3	4	14	4
Total		50 4			14 8			64 12	
19. Spanish.	} Large seeds, under dung, chiefly neats.	74.	8	12	27.	1	4	10	0
20. Red French.		40.	9	4	33.	1	12	11	0
21. Common wife.		131.	18	2	60.	4	2	22	4
22. Cronos*		42.	7	0	27.	1	8	8	8
23. Munster white.		62.	8	12	31.	2	0	10	12
24. Apple.		60.	12	8	32.	2	4	14	12
Total		64 6			12 14			77 4	
25. English white.	} Under dung.	71.	13	0	2.	3	4	16	4
26. White French.		45.	13	4	6.	2	8	15	12
Total		26 4			5 12			32 0	

* Some error of the men suspected in this sort.

Whoever casts an attentive eye over the preceding table, will see that several circumstances of information are immediately pointed at; there are very many others which are omitted; those before us appear to be so satisfactory, in the several variations which arise upon the face of the table, that he shall, at convenient time, pursue all the changes which the subject will admit of. In the mean time he proceeds upon the present information.

The first question is this, whether planting potatoes under or over the dung, is most advantageous to the crop? This question appears to be conclusively answered by every species of potatoe in the first and second set; and the totals of each clearly determine in favour of putting the seed over the dung.

N ^o 1 to N ^o 6, over dung, gross produce	lb. oz.
— 7 to — 12, under dung, ditto	105 4
	84 3

Over dung superior to under, by 21 1

This difference of 21 lb. upon so small a quantity of ground, would be a very great object upon an acre. Happily in this kingdom (Ireland) the potatoes are chiefly laid over the dung. In England they practise the contrary in many places.

The second object in this enquiry was, to determine, by fair experiment, whether the small seed is equally prolific, as thousands assert it to be, with that which is reasonably large. For this purpose, he cut single eyes with his own hands, and

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was careful not to cut them thin, but like pellets. This set was planted under dung; and therefore we must compare it with our second set of experiments.

N ^o 7 to N ^o 12, under dung, gross produce	lb.	oz.	
— 13 to — 18, under dung, gross produce	84	3	
	64	12	

Reasonably large seed preferable to very small, by 19 7

This upon an acre would be a prodigious difference: and seems decisive in favour of seed moderately large. Whereas, N^{os} 19 to 24, both inclusive, seem by no means to prove very large seed to be necessary: for if we compare those numbers with N^o 7 to 12, both inclusive, we see the greater

produce from the larger seed is by no means regular, and therefore that point is not decisive in the present enquiry; and the remark upon N^o 22 should not be forgotten.

Our third object in this enquiry is a truly important one to the poor labourer of Ireland, *viz.* to ascertain, with accuracy, which kind is most prolific upon poor broken ground. As N^o 25 and 26 did not come to hand time enough to introduce them in the whole set of experiments, he must throw this part of his enquiry into two divisions, as there is so material a difference between planting over and under dung. To do this in the shortest manner, he shall only throw the several kinds into two little tables, according to their merit in quantity; the quality is a consideration chiefly at the gentleman's table.

Sorts.	Modes of planting.	Produce.						
		Merchantable.			Small.		Total.	
		No.	lb.	oz.	lb.	oz.	lb.	oz.
N ^o 1.								
3. Common wise.	} Over dung.	103.	16	2	5	4	21	6
6. Apple.		50.	15	8	4	10	20	2
2. Red French.		93.	13	8	2	4	15	12
5. Munster white.		62.	12	8	3	8	16	0
4. Crones.		53.	12	4	4	2	16	6
1. Spanish.		91.	12	4	3	6	15	10
N ^o 2.								
9. Common wise.	} Under dung.	89.	15	2	4	8	19	10
12. Apple.		58.	14	14	2	8	17	6
26. White French.		45.	13	4	2	8	15	12
25. English white.		71.	13	0	3	4	16	4
11. Munster white.		54.	9	14	3	8	13	6
10. Crones.		48.	9	12	2	1	11	13
8. Red French.		40.	9	0	1	12	10	12
7. Spanish.		54.	7	12	3	8	11	4

Here we always have the order of merit in point of quantity of the merchantable potatoes, from equal culture. The totals vary a little, as in the preceding table. The wise and apple potatoes keep their places in both tables, as to produce; but the red French and Munster white, and crones, contend pretty closely as to produce; and in the second table vary in their places of merit. Hence we may conclude, that some of these kinds agree better by being put under the dung than others; but every examination of the latter point clearly proves, that under dung lessens the crop. The Spanish potatoes, which are certainly the best in the world

for eating, uniformly keep their place, of being last in point of produce. There is another very material point, worthy of the cultivator's attention in his choice of his potatoes in these tables. He will observe, doubtless, that he has given the number of the merchantable potatoes of each kind; he will therefore see that there is a prodigious difference in their sizes, a circumstance that comes strongly against the wise potatoes. A table upon that point, framed from the preceding ones, according to the order in point of size, is given below.

No.		No.		lb.	oz.		oz.
6.	Apple	50.	Weight	15	8	Average weight per potatoe	5
26.	French White	45.	Ditto	13	4	Ditto	4 ³ / ₄
4.	Crones	53.	Ditto	12	4	Ditto	3 ³ / ₄
2.	Red French	63.	Ditto	13	8	Ditto	3 ³ / ₄
5.	Munster white	62.	Ditto	12	8	Ditto	3 ¹ / ₄
25.	English white	71.	Ditto	13	0	Ditto	2 ⁷ / ₈
3.	Common wise	103.	Ditto	16	2	Ditto	2 ¹ / ₂
1.	Spanish	94.	Ditto	12	4	Ditto	3 ¹ / ₂

The following table shews the quantity and quality in the different sorts of produce.

Quantity of Produce.	Quality.
1st. Common wise.	1st. Spanish.
2d. Apple.	2d. English white.
3d. Red French.	3d. Munster white.
4th. Crones.	4th. White French.

Time Sets and Method of planting.—Mr. Donaldson says it has been proved from long and general experience, that the month of April is the best season for planting the root, so as to produce a farinaceous or mealy crop. Potatoes are frequently planted in the end of May, and sometimes even in June; but the crops, although often as abundant, are neither so mellow nor so mature, as when the sets are planted in April, or in the first eight or ten days of May. A late

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practical writer, however, contends, that this sort of work should constantly be performed as soon as possible after the danger of the frost is over, which, in the more northern districts, is generally from about the middle of March till the latter end of April; and in the northern ones, from about the middle of April till towards the close of May, according to the differences in the state of the climate. The earlier the crop can be got into the ground, the better it becomes. Besides, the potatoes have a better chance of being taken up and removed from the land, while the season is dry; and there is less risk of injury from moisture and frosts, after they are fit for taking up. It may also be added, that the land will derive much advantage from being ploughed up while it is in a dry condition, after the potatoes have been removed, as in this way it is preserved in a less moist state during the winter, and the weeds are more effectually destroyed. But at whatever period the crop may be put into the ground, the business should be performed as much as possible when the weather is dry, and the land not too much soaked with moisture, as under such circumstances the early vegetation of the crop always proceeds in a more regular and expeditious manner, by which the produce is generally rendered better in quality, and more abundant.

In the Present State of Husbandry in Great Britain, it is observed, that there are a number of what are called *eyes* in every root, each of which produces a separate plant. This points out the propriety of planting the large and middle-sized roots, properly cut, in place of the smallest, uncut; as when the larger potatoes are properly cut, one, or at most two eyes only, being left in each set, there is no danger of too many plants springing from the same root, which must often happen, when small potatoes, with a great number of eyes, are set whole. It is the common practice, and against which there appears no well-founded objection, to cut potatoes, intended for feed, into small pieces, about half an inch square; in the course of which operation, attention is paid to single out the eyes that appear strongest, and most vigorous.

In this way, one root of ordinary size furnishes three or four sets, or pieces proper for planting. This, for the reason above-mentioned, is a better method than setting either large or small potatoes uncut. There has, however, been much difference of opinion in respect to the best sort of sets for the raising of this crop, whole potatoes and large cuttings having been contended for by some cultivators, while others, on the ground of experience, are equally strenuous in support of small cuttings, sprouts, shoots, or even only the eyes or buds. With all these different sorts of sets, good crops are stated to have been raised; though tolerable sized cuttings of pretty large potatoes, with two or three good eyes or buds in each, are probably to be preferred. Independent of the increased expence of the seed, it is never a good practice to make use of whole potatoes as sets. The experiments of the Rev. Mr. Campbell, of Argyleshire, as stated in the ninth volume of the Bath Papers, not only throw much light on this subject, but also on the most proper distances of planting in regard to the rows.

Rows.	In 1790.	Inches distant in the Rows.	Value per Acre of the Produce after the Seed is deducted.
			£ s. d.
1.	Small whole potatoes	- 6	16 6 7 $\frac{1}{2}$
2.	Large pieces	- 3	15 16 6
3.	Large pieces	- 6	15 8 6
4.	Large pieces	- 12	13 4 1 $\frac{1}{2}$

Rows.	In 1791.	Inches distant in the Rows.	Value per Acre of the Produce after the Seed is deducted.
			£ s. d.
1.	Large whole	- 6	18 18 1 $\frac{1}{8}$
2.	Small whole	- 3	18 1 4 $\frac{1}{8}$
3.	Small whole	- 6	17 11 9 $\frac{3}{4}$
4.	Small whole	- 12	17 3 6
5.	Small pieces	- 6	16 1 5 $\frac{1}{4}$

Rows.	In 1792.	Inches distant in the Rows.	Value per Acre of the Produce after the Seed is deducted.
			£ s. d.
1.	Small whole	- 6	19 7 1 $\frac{1}{8}$
2.	Large whole	- 6	18 18 1 $\frac{1}{2}$
3.	Large whole	- 12	18 9 9 $\frac{1}{2}$
4.	Large pieces	- 6	18 3 0
5.	Small whole	- 12	18 1 5 $\frac{1}{4}$
6.	Large pieces	- 12	16 19 6

In 1794.—Table I.

1.	Undunged potatoes, after dunged turnips	25 19 8 $\frac{3}{4}$
2.	Undunged, after dunged fallow	27 10 2 $\frac{6}{12}$
3.	Undunged, substituted for a summer fallow	14 10 6 $\frac{1}{12}$
4.	Purple-hearted, dibbled in the top of a well-dunged row	48 10 6 $\frac{1}{12}$
5.	White kidney, planted in the same manner	27 2 5 $\frac{1}{12}$
6.	White kidney, upon much dung in the row	29 0 9 $\frac{6}{12}$
7.	White kidney, upon little dung	24 16 8 $\frac{10}{12}$
8.	White flat potatoes, upon little dung	30 19 0

In 1794.—Table II.

1.	Middle-sized whole	12	32 8 0 $\frac{1}{12}$
4.	Small pieces	12	29 19 2 $\frac{3}{12}$
6.	Small whole	12	29 2 4 $\frac{1}{12}$
5.	Small pieces	6	28 17 6 $\frac{11}{12}$
7.	Small whole	6	26 19 3 $\frac{7}{12}$
3.	Middle-sized whole	6	25 7 5 $\frac{1}{12}$
2.	Middle-sized confined to one eye and stem	12	23 12 1 $\frac{1}{12}$

Without dung in 1795, after dunged potatoes.

7.	Middle-sized whole	6	28 11 7 $\frac{7}{12}$
2.	Large pieces	12	26 1 10 $\frac{5}{12}$
4.	Small whole	12	24 2 11 $\frac{8}{12}$
5.	Middle-sized whole	12	24 2 11 $\frac{3}{12}$
6.	Middle-sized whole	9	23 19 5 $\frac{1}{12}$
3.	Large whole	12	23 10 8 $\frac{10}{12}$
1.	Shoots	12	15 11 9 $\frac{6}{12}$

The real produce from 50 yards of row, planted with shoots, was only two pecks $\frac{5}{12}$ ths, but only 63 of 150 came up; if none had failed, the produce would have been more than what is stated in the table. This calculation, then, it is supposed, goes on the supposition that the 150 shoots had borne in the proportion in which the 63 did. And further, that each of the experiment rows in 1790, was 75 yards in length; in 1791 and 1792, 200 yards; in 1794 and 1795, 50 yards. And that the numbers prefixed to the rows in 1794, Table II., and in 1795, point out the order, or juxta-position, in which they were planted.

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Extract from Experiment on Potatoes in 1794.

Rows.	Inches distant in the Row.		By Experiments per 50 yards of Row.			By Calculation per English Acre.			Value per Acre at 6d. the Linlithgow Peck.		
			Bls.	Pks.	Lbs.	Bls.	Pks.	Lbs.	l.	s.	d.
1.	12	Produce	0	12	8	90	2	15	36	1	4 ⁰ / ₁₂
		Seed	0	1	5	9	2	13	3	13	4 ¹ / ₁₂
		Clear produce	0	11	3	81	0	2	32	8	0 ⁰ / ₁₂
2.	12	Produce	0	10	0	72	9	11	28	0	9 ⁰ / ₁₂
		Seed	0	1	10	11	1	5	4	8	7 ¹ / ₁₂
		Clear produce	0	8	9	61	8	6	23	12	1 ¹ / ₁₂

A specimen of the manner in which the experiment tables were originally constructed is given in this instance.

These potatoes were planted in rows upon dung, except where it is otherwise mentioned, and then covered up with a double earth-board. In 1790, 1791, and 1792, the rows were three feet; and in 1794 and 1795, two feet and a half asunder. This, with the difference of seasons, will account, it is supposed, for the greater produce in the last two years. The distances at which the potatoes were planted in the rows, were measured by a stick with notches, and taken from the centre of the potatoe-fets. Care was taken to have the rows as equal in quality of soil as possible, and to have equal justice done them in manuring, where manure was applied, and in horse-hoeing them. The quantity planted and raised was carefully marked in the field by the author of the experiment, and no part of the process of management was intrusted to any other person. It is likewise noted that, in the experiments, the acre is the English statute acre of 4840 square yards; so that when the rows are three feet asunder, 4840 yards of row make an acre. When the rows are two feet and a half asunder, it will take 5808 yards of row to make an acre. The bolls and pecks are the Linlithgow measure, and the Amsterdam pound is used as a measure of compound parts, being the nineteenth of this peck; the value affixed to potatoes is the price they produce, *communibus annis*, at the Edinburgh market.

From the comparatively small produce of potatoes confined to one eye and stem, (see experiments in 1794, Table II. row 2, it is supposed, that the method recommended by some writers on farming, to pull away the supernumerary stems, is evidently improper. The potatoes in row 2, were not only confined to one eye, but to one stem, by pulling up the supernumerary ones. This last precaution became the more necessary, as stems were found issuing in abundance from potatoes which had been deprived of all the eyes; and even from two out of twelve potatoes, which had been planted after all the outer surface was pared off. The result was, that row the 2d, though it had most weight of seed, had the least produce of all the experiment rows; it had more than four times the quantity of seed contained in row 4, the produce of which, however, exceeded it at the Edinburgh prices, by more than 6l. per acre. The productiveness of potatoes, then, it is observed, is probably not occasioned by the weight or quantity of the sets planted, but by their having that number of sound and perfect growths, which the soil they feed in can bring to perfection. The general result of the experiments is unfavourable to the opinion, that the weight of bulb has any effect in determining the quantity of produce; in most of the five years experiments, the produce from pieces of potatoes was inferior both to large and to small whole potatoes; yet, in general, the pieces exceeded the small potatoes in weight of seed.

Though the large and small potatoes, mentioned in the experiments, were relatively so, compared with one another, yet some of those, called large ones, might perhaps, with more propriety, be denominated middle-sized potatoes. An acre of very large potatoes would require a quantity of seed so great as to deter any person from planting them; nor is it likely, that the productiveness of potatoes will continue to increase with their size. There is certainly, the writer thinks, a *maximum* and *minimum*, a *ne plus ultra* in the quantity of potatoe seed, as well as in every thing else. The middle-size of the human species, as well as of the different species of other animals, are the best calculated to undergo fatigue and labour; they are therefore more perfect in their kind, and consequently fitter to answer all the purposes of their creation. May we not argue from analogy, that potatoes of a moderate size are the most perfect in their kind, and consequently the best fitted to send forth those vigorous shoots, which insure a well-sized and healthy progeny? And that, the greater the number of strong fibres and roots, the more do they search for food, and the more earth do they displace in the course of their growing; which divides the soil more minutely, and gives it the advantage of better pulverization; and the greater abundance there is of leaf, the more nourishment is extracted from the air and dews, which are thus made to co-operate more with the vegetable pasture in the soil, in bringing the plants to perfection; and the thick foliage of the crop, by its umbrageous shade, has the same ameliorating qualities with a heavy crop of peas or beans, in destroying weeds, retaining the dews, and preventing the drought from penetrating and exhausting the soil. The writer says, however, it is to be observed, that too many, as well as too few, stems are unfavourable to the prevalence of fibres, and to the luxuriance of the leaves. Perhaps pieces about 2 oz. weight are the most proper for being planted, and whole potatoes from that weight to one ounce; these may be called large pieces and small potatoes; and from them, it is probable, there will issue a sufficient number of stems to produce as many roots as the immediately surrounding earth can bring to perfection. To produce more would make the roots small: to produce fewer, would give a less quantity of root from the acre. The roots procured from small whole potatoes, and from large pieces, both planted at twelve inches distance in the row, were better sized than those from large whole potatoes; and the roots from plants at twelve inches were larger than from plants at six. And large potatoes planted whole at any distance, and whole potatoes or pieces at a nearer distance than twelve inches in the row, send forth so many stems, that, like cattle upon over-stocked pastures, they starve each other, and the produce is dwarfish. And it is supposed that shoots, small pieces, and potatoes confined to one stem, or a very few, resemble cattle upon pasture not nearly stocked;

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stocked; which, therefore, cannot make the proper returns to the owner. Large potatoes are more easily disengaged from the soil than small ones, and are more readily perceived at the time of taking them up; and therefore are in less danger of being left ungathered. They take less time in gathering, which makes the expence of that operation smaller; and they sell better in the market. An objection to them, that they are not so easily boiled, is removed by splitting them, which will likewise make them drier, and better tasted. These advantages attending the produce of small potatoes and large pieces, added to the economy in the article of seed, and the saving of time in planting them, seem to balance any little superiority, in point of quantity, gained by planting large whole potatoes at twelve inches, or any size of potatoes or pieces at a nearer distance in the row; and roots, so small as not to be distinguishable from the produce of curled potatoes, ought never to be planted where potatoes are subject to that disease. From eight potatoes, the produce of one curled one, planted in 1795, three came up curled, and that in a farm where it was a matter of difficulty to find a curled plant upon which to make the experiment. This fact deserves the attention of cultivators in general.

A disadvantage attendant upon planting shoots instead of potatoes is, that they do not ripen near so soon, and are therefore more exposed to injury from the equinoctial gales, and from early frost; neither do they admit of being planted so early as potatoes, as they are more delicate, and more apt to be hurt by the cold. But the chief disadvantage is, that many of them fail entirely, or become such bad plants as to have very little produce. Other writers seem, however, to have been more successful with shoots.

The following are some observations offered on the experiments stated above, in Table I., in 1794.

Observation 1.—It is of great consequence to the farmer to pay attention to the kind of potatoe used for planting: see the amazing difference between N^o 4 and N^o 5. Though the most productive kind should not be the best tasted, it ought, however, to be planted for the use of horses, cows, hogs, and poultry. The potatoe in N^o 8 is the best eating potatoe of those mentioned in the experiments; yet the produce from it, with little dung, exceeded that from N^o 6, with much dung.

Observation 2.—From the difference between N^o 6 and N^o 7, the former of which had three times the quantity of dung that was applied to the latter, the farmer will judge whether it is his interest to dung sparingly or plentifully; always paying a due regard to the condition of his soil, and the expence at which he can provide manure.

Observation 3.—From the produce of N^o 3 it appears, that undunged potatoes are preferable to a summer-fallow without dung. And from comparing N^o 1 with N^o 2, it is clear, that a dunged summer-fallow is not so profitable as a dunged crop of turnips, both followed by a crop of potatoes with dung. An acre of potatoes at 27*l.* 10*s.* 2½*d.* after a dunged fallow, will bear no comparison with an acre of potatoes at 25*l.* 19*s.* 8¼*d.* added to a crop of turnips, the produce of the preceding year, of 30 tons.

Observation 4.—From a comparison between rows 5 and 6, planting potatoes upon dung in the row seems to be a better method than dibbling them in the top of the row, after the dung is covered up. But where the farmer is so situated, as to be under a necessity of planting them in a wet soil, perhaps it may be his interest to place them in the top of the row, as this method will keep them from the cold and moisture at the bottom, which would be apt to destroy them.

It is supposed by different writers, in the second volume of Transactions of the Dublin Society, that in scarce seasons, the shoots and the eyes or buds, scooped out by an implement for the purpose, are capable of being set with equal advantage as the cuttings; but they are obviously liable to many objections, and should never be had recourse to, but from necessity. They want that proportion of matter about them, which is essential to the health, generation, and establishment of the plants. The following interesting experiment on scooping potatoes, made by the Rev. Mr. Findlater, of Fundale, and inserted in the Farmer's Magazine, is highly deserving the cultivator's attention.

He chose a number of potatoes of the same species, similar in size as might be; he scooped out a parcel of the best looking eyes with cutler Wright's hemispherical scoop; he cut also out a number of equally good looking eyes with a knife, taking as much as possible of the mother potatoe to the eye; he chose out nine of the best looking scoopings, and an equal number of the best looking cuttings,—these he planted in alternate drills upon a border, three in each drill. His whole sets sprouted, and no accident occurred; but the scoopings came up, and continued perfectly dwarfish in comparison of the cuttings. They were raised in two separate baskets in the beginning of November, and laid by in a closet to be weighed. The weighing was neglected to the middle of December; but the result was what might be expected from inspection at raising: the produce of the cut ones weighed a stone and a half tron; that of the other, three quarters of a stone, without reckoning very inconsiderable fractions. The experiment was merely made to ascertain which throve best. Anxious to do the scoopings justice, he pressed the scoop deep in, with considerable violence; and probably the forcing of the scooped piece into the narrow contraction of the hemisphere, bruised and damaged its substance. Would not an opening answer better? And he adds, that captain Mackay, of Scotton, in this parish, cut one peck with the knife; he scooped also an equal quantity; (the scooped ones were not weighed before and after scooping, which would have ascertained the saving of potatoe substance in the seed). They were set in the same field; no difference was observable in their growth; at raising, the difference of the produce, by measure, was in favour of the cuttings by one peck and a half: the deficiency in produce of the scoopings being probably more than compensated by the saving of substance in the seed. He apprehends, that the writer's error in the mode of scooping had been avoided. It is, however, observed, that the produce of the scoopings were the best sized potatoes.

But in speaking of the difference of opinion in respect of scooped cuttings, Mr. Young remarks, that from some experiments carefully made, the result of which he is well acquainted with, it appeared, that these contradictory opinions might be equally just, when founded on variations in practice. When the soil is sandy, or in a very light pulverized, or highly manured state, and every other requisite for success beneficially secured, these scooped cuttings succeeded just as well as larger sets; but when the soil was more stiff, unfavourable, in worse tilth, or not equally manured, or the sets ploughed in, under circumstances not very favourable, then the larger cuttings had a considerable superiority. The propriety, therefore, on any future occasion, of having recourse to this expedient, will depend on the state of the lands, the soil, the manuring, &c. If no cutting be done by the bushel, two-pence is a fair price, where woman's labour is eight-pence a-day. This sort of work is, however, seldom well performed when left to women.

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Therefore it may on the whole be concluded, with respect to the proper seed or sets for the raising of potatoe crops, that though the quantity of produce does not, as has been commonly supposed, bear any exact ratio to that of the weight of the set, yet that it in some measure depends upon that circumstance, and there being a suitable number of eyes as well as of pulpy material about them.

The proportion of ground that can be advantageously cultivated under this root, must depend wholly upon the circumstances of the farmer. Mr. Young strongly cautions those farmers who are unacquainted with the culture of it, against applying too much land to it. If they have a great plenty of dung at command, they may enter largely into the husbandry; but they should determine to plant no more land than can be manured at the rate of twenty-five or thirty large loads *per* acre; for one acre well cultivated, will pay better than five or even ten indifferently managed. But besides this, there are many other points to be considered before he fully decides, such as those of the number of acres of carrots he has sown; for if his soil be suitable to that crop, they are greatly to be preferred to this root, being cheaper, not requiring dung, and being applicable to all the uses to which potatoes are applicable. They do not at all impoverish the land, whereas potatoes scourge it, if the expression be permitted, more than any other crop the farmer puts in. These are very material motives to influence a preference. But if the soil will not suit carrots, then it will be necessary to plant so much the more potatoes. The same observation may be applied to cabbages, which also, in a great measure, answer the purposes of potatoes. If he deals largely in that crop, it lessens the necessity of having this root; and ruta бага is as useful to hogs as the potatoe itself; but being far more uncertain, and the difficulty of securing a crop of it being greater, it cannot be depended on like potatoes. The fly and drought, &c. are so fatal to it, that many farmers in Norfolk have sowed in vain for several years together. But whatever the extent of land may be that is appropriated to this sort of crop, such of it as is designed to be planted early, should in the latter end of April all be hand-hoed over the whole surface, to cut up weeds clean, and loosen the earth. This management is known only in the neighbourhood of London, but it should be extended over the whole kingdom, for the excellence of it is indisputable. The expence of hoeing, when there is a clear space to cut, is trifling, and the succeeding cleaning which the potatoes receive after they are up, is performed at a much less expence on account of this operation, and at the same time in a more effectual manner. And the cheapest and most effective method of performing this necessary operation is by a large shim, which cuts three or four feet of surface. For this purpose, there should be a small broad wheel at each end of the beam, to regulate the depth. The work is confined to the surface, the intention of it being merely to cut up weeds and to loosen the earth, which rain and succeeding sunshine may have encrusted. The operation is of great importance, and lessens the expence of the hoeings that may be afterwards given very greatly.

Where land is scarce, and of course dear, the borders near hedges, and other waste parts, may also be converted to the raising of this crop with advantage in many instances.

With respect to the planting of this root, there are many different methods in use, in different districts; but the great object should constantly be, to preserve the plants, as much as possible, in a medium state of dryness. They

are likewise grown after different sorts of crops and on different sorts of land. The author of *Modern Husbandry* states, that they are cultivated by farmers in general, after every sort of white-corn crop; but in Lancashire, for the most part, on lands broken-up from grass for the purpose. This practice was no doubt borrowed from Ireland, where it appears to have been generally established soon after the introduction of potatoes into that country. And that there are different methods of applying the dung, which however ought always to be done with a liberal hand. Sometimes the field is formed into one-furrow ridges at the second ploughing. The dung is then laid in the furrows; and the potatoes being planted by hand on the dung at the distance of eight, ten, or twelve inches asunder in the furrows or drills, they are then covered up with the plough, which is done by splitting the one-furrow ridges. In Lancashire, where this sort of business is well performed, in planting, the practice is, after the land has been made fine and perfectly level on the surface, to make equidistant drills the whole length of the field, in doing which, the plough, after making a furrow up the field, is drawn down again on the contrary side close by the same, throwing the soil equal heights on each side. These drills are made as wide and deep as to render them capable of containing the dung, which is laid in the bottom of each. The distance of the drills is such, that when the horses stand in one, each wheel of the cart or tumbril may be in the middle of the next drill on each side. The next operation is to carry in the manure, and as the horses stand in one drill, and each wheel of the cart in a similar situation, the neatness and order of the land is little injured. The dung is then thrown out of the cart in small heaps, sufficient to supply the three drills or furrows which the horses and the wheels of the cart occupy, a moderate scattering of which is put into the bottom of each; the whole being completed in a very short time by persons with forks with two tines or prongs. The long strawy dung lately thrown out of the stables or cow-houses, or collected from the farm-yard, is always employed where it can be had. When the drills are thus prepared, the sets are put into them upon the dung, about six or eight inches distant from each other. After this the plough is run on each side of each drill, to throw the earth, that was raised out of it, upon the potatoes, and cover them, which operation elevates it in the middle, and causes it to lie sloping on each side like the roof of a house, when the business is completed until the stems of the potatoes begin to make their appearance above the surface.

But according to the author of the *Agricultural Report* of the West Riding of Yorkshire, where the culture of this root is likewise well performed, after the land has been properly prepared, the best cultivators begin to ridge it up, by ploughing a furrow round it down, and then taking a suitable distance according to the nature and qualities of the soils, as from about two feet eight inches to three feet, such as are rich and fertile requiring more space of ridge, than such as are poor and exhausted. The manure, where necessary, is deposited with regularity in rows by means of a labourer with a fork, in the ridges, the potatoe sets being then placed at proper distances upon it and covered with the plough.

And another method of ridging, which has been found beneficial in some of the northern districts, is, as soon as the land has undergone a full preparation, and is made perfectly fine and level, by repeated ploughings and harrowings in different directions, to draw straight parallel furrows by means of a double earth-boarded plough, drawn by a single horse, at the distance of two feet and a half from each

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other. This operation is performed in the most correct manner, by passing the plough twice in the same place, which, when the land lies sloping or uneven, should be down hill the first time. The manure is then brought on in carts from the higher sides of the fields, where they are hilly, the horses passing in one furrow, and each of the wheels in others on the different sides; they are then emptied by the drivers, who walk behind them with crooked three-pronged forks, constructed for the purpose, leaving it in small heaps in the furrows in which the horses go, in sufficient proportion for the three drills. It is then divided and spread out in the different rows, in as equal a manner as possible, by women and children, the sets being put in upon it at the distances of about eight or twelve inches from each other, the whole being afterwards covered in by the plough, by splitting or dividing the ridges betwixt the rows, and passing twice in the same track, as in the work of opening the furrows for the rows of the crop.

There is still another raised mode of planting this useful root, which is stated in the original Agricultural Report of the County of Cheshire. It is the custom there to form the land into narrow beds, of about three, four, or five feet in breadth, by the plough; the manure, when necessary, being previously spread out evenly upon the ground, and turned down. The sets are then planted by means of a dibbling-stick to the depth of about three inches, in rows ten inches apart, and alternately eight or ten and twelve inches in them, so as that the root-shoots of the plants may occupy the ground as completely as possible, without interfering with, or injuring the other. When the shoots of the plants first appear upon the surface, each of the furrows or divisions between the beds is dug out to the depth of about one spit; the loose earth thus raised being cast as evenly as possible over the plants in the beds, by which they, as well as any weeds that may have sprung up, are covered, and the growth of the former greatly promoted, while the latter are in a great measure destroyed. And in cases where the staple of the land will admit of it, in about a week or ten days afterwards a second covering is dug out, and thrown over the crop in the same manner, by which its growth is still farther promoted. In this mode of planting, as much fresh earth is from time to time applied to the plants, their vigorous vegetation is not only secured, but the extension of the roots rendered more full and complete. As a quantity of fresh earth is thus annually furnished for the growth and support of the potatoe, it is asserted in the first volume of the Agricultural Magazine, that repeated crops may be taken from the same land, even where manure is not made use of, without its being exhausted in any great degree. It is therefore supposed, that it may be had recourse to with advantage where manure cannot be easily procured. And from such lands as are inclined too much to the retention of moisture, for the perfect growth of crops of this sort.

But the raising of the land into high ridges is not adapted to every sort of soil. It is obvious that such sorts of land as are very dry, and of a sandy nature, should have the surface kept as level as possible, in order that the proper degree of moisture may be more effectually retained and preserved for the support of the crops.

In moist situations, and where the soils are less subject to be injured by parting with their moisture, it may, however, be the most suitable practice to raise them into ridges, as by such means the depth of the staple is augmented, the manure more concentrated for the support of the crop, a better bed provided for the fibrous roots and wires of the plants to establish and extend themselves in, the danger of stagnant moisture guarded against, and the after-culture of the crops

rendered more easy, beneficial and convenient, by which they may be kept more clean and free from weeds, and be earthed up at different times, so as to insure the most full and perfect extension of the roots in the fine mould that is thus constantly laid up to them. And as the whole of the process is capable of being performed by means of the common plough, with a horse or two, it is probably the most advantageous where such crops are cultivated on land that has been some time in the state of tillage. In cases where the ridges are only required to be small, the operation is completed in one bout of the plough, or by going up with one furrow, and laying another up to it in returning, so as to produce a ridge in the middle between them.

And where the method of horse-hoeing this sort of crop is in use, by which great crops are in many cases obtained, the practice in respect to distance is various; but whatever mode is adopted, the land must be ploughed into proper ridges for them accordingly. Mr. Young says they have been tried in equi-distant single rows, at two, three, four, and five feet; in double rows at one foot, on four-foot ridges; these, and also three rows on five-foot ridges. But though attended with success, these wide distances between the single rows certainly lose too much ground. When equally distant rows are employed, he thinks three feet preferable. And double rows on four feet have been successful. Equal distant rows, at two feet, with a neat horse-hoe, which turns no furrow, only cutting the surface of the earth, and earthing up afterwards with a double mould-board, have likewise answered very well.

Also in planting this kind of crop upon the plain surface, there are likewise different modes made use of in different districts, and under different circumstances. In districts where the soils are inclined to be dry, it is in some cases the practice, after the land has been brought into a proper condition by ploughing over twice, or oftener, and well harrowed, to spread the manure regularly over the whole surface, the sets being planted in every third furrow, and the dung with the fine earth turned upon them by the next furrow of the plough. In this way the manure is however placed upon the sets, which has on experiment been fully shewn to be injurious to the produce. Besides, from the whole of the surface of the ground being covered with dung, a considerably larger proportion must be requisite, than when deposited only in the drills, and of course the crop be cultivated to disadvantage in that respect.

In the above-named district, on shallow soiled land, potatoes are, however, generally planted and soiled with the plough, a method which is said to consume less manure than others. In this mode of planting, the land being first prepared as above, a furrow about four inches deep is turned; the manure is spread lightly in the hollowed space, the potatoe sets having been previously dropped into it, at the distance of about eight or ten inches asunder, or, which is as commonly practised, put upon the dung after it has been put into the furrow in the same manner, by which they are supposed to vegetate more speedily; the same furrow is then turned back upon the sets: the next row of sets is dropped and covered with the manure, or put upon it, in the hollowed space of a furrow, which is turned towards the first row, at the distance of about eighteen inches from the first line of sets for instance, leaving something more than two furrows width of soil untouched by the plough; the sets and manure are then covered as before, and the same method pursued till the whole of the ground intended to be planted is finished. The soiling with the plough is performed in this way. As soon as the plants begin to appear, the ground, which had previously been left untouched, is split

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or turned to each side upon the young plants with a long wrested plough, so as to effectually cover them. After this has been done, the crop is to be kept clear of weeds by the hand and hoe.

But in other cases, as soon as the land has been properly ploughed and harrowed in a smooth even manner, the manure is spread equally over the whole surface, as above, and then ploughed well in, when the planting is immediately begun, and executed in the following way: a man has a dibble with an iron point, and a place for him to set his foot upon to strike it into the ground, in order to make a hole for the set. He is followed by a woman or boy with the sets, who drops one into each hole; after which the land is harrowed over once or twice, or more, when the work is finished. In this way they are set promiscuously, at from nine inches to a foot apart; and the business is effected with expedition, and without much expence, from fifteen to twenty bushels of potatoes being sufficient for setting an acre of land.

About Ilford, in Essex, they plant immediately after the plough; a man dibbles across the land, followed by a woman who drops the sets, for both which operations they are paid seven shillings or eight shillings the acre; the rows twelve inches by fourteen or fifteen, and some twelve square. Early in the spring, sixteen or eighteen hundred weight are planted on an acre; they are hand-hoed twice, each time at the expence of four shillings.

In other parts of the same district they are sometimes planted on three-foot ridges, one-bout ridges, and in rows at eighteen and thirty inches.

In planting this sort of root on sward land, after it has been prepared by the use of a plough that just pares off the surface, and deposits it in the furrow, it is advised by Mr. Somerville to place the sets upon the inverted sod, and cover them with the loose mould from below, by means of a common plough. Or, the trench plough may be used with perhaps more advantage. But the best method is that of paring and burning, as has been shewn above.

In some cases the practice is, however, to turn down the turf with or without manure, and then to put in the sets by a dibble; though the former is probably the better practice, as the turfy material on which the sets are put soon begins to decay, and the purpose of manure is in some measure answered by it. It is a plan that may be adopted with advantage where manure is scarce, as in bringing waste and other coarse grass lands into the state of preparation for grain crops.

And Mr. Donaldson states it as the custom in the neighbourhood of towns and villages in Scotland, for the farmer to let a field to the inhabitants at a certain rate by the rood or perch. The renters or hirers of the land pay a specified rent, and agree to furnish a sufficient quantity of dung. The farmer is at the expence of carrying the dung, and of ploughing and harrowing the field. The renters attend at the last ploughing, and plant the sets in the bottom of every furrow.

However, though these are the common modes of setting potatoes where that sort of husbandry is carried on upon an extensive scale in the field, there are others with the spade which are probably preferable on soils of proper depth where labour is cheap; the first of which is pretty commonly adopted in Lancashire, and in some districts in the north-east of Scotland; which is, to trench the land. The farmer having carried the dung, and laid it on the field in heaps, at proper distances, the operation is performed by the manufacturers and people who rent the field, and in the following manner: across the end of the ridge a trench is formed, about three feet wide, and from ten to fourteen inches deep, according to the depth and quality of the sub-

soil. That being done, a second trench of the same breadth is marked off, and the surface-soil, to the depth of six or eight inches, is thrown into the bottom of the former trench, over which a sufficient quantity of dung being laid, the potatoes are planted at the distance of eight or ten inches from each other, and then as much earth is taken from the bottom of the second trench, as is necessary for covering the potatoe-sets, and of making up the first trench to its former level. Thus the field being completely trenched, well manured, and kept thoroughly clean by repeated hand-hoeings, must not only produce an abundant crop of potatoes, but also be in high condition for receiving whatever kind of seed may be afterwards sown.

And another mode of setting the root with the spade is that which is termed the lazy-bed method, which was formerly well known in many parts of England, as well as all over Scotland, although now confined to the very remote districts of the latter kingdom. The term applied to this mode of culture, indicates that it was invented to save labour, and must have been adopted for any length of time by those only whom indolence and ignorance precluded from following other methods. These beds are formed of such a breadth, as that any man used to the spade, can with ease throw earth almost from one side to the other. The manner of forming them is as follows: the size of the bed is first marked off with a line, and from two to four feet left on each side for trenches. The surface of the bed being then dug, or turned over with the spade, the dung is spread, and the sets planted, at about the distances last mentioned, after which earth from the trenches on each side of the bed is thrown over the dung and the plants, so as to cover them to the depth of three or four inches. Mr. Young, however, advises a neater mode of executing this business, in which the land is marked into beds five feet wide, with narrow slips between them two feet wide. These are then dunged about fifteen loads *per* acre; on the dung are laid the potatoe slices, after which the turf is dug thinly up in the two-foot intervals, and laid on the sets, which, with another spit, and the loose mould, completes the covering. This mode is not equal to digging all the ground, on account of its being left whole for the succeeding crop, but the crop of potatoes is generally good; for, besides the dung, they have the turf below to spread upon, and are partly covered with that from the trenches, so that they lie hollow, and in a rich bed of mould.

And in planting the shoots as sets for this crop, the best practice may perhaps be that of putting them in slight shallow sorts of drills, made by a very small light plough for the purpose, at the distance of eight or ten inches from each other, and seven or eight in the rows, putting the root part downwards, which may be readily executed by women or children. After this has been performed, a small proportion of dung is to be laid thinly over them, and the earth from the sides of the drills lightly drawn over so as to protect them against any frosts that may happen. As soon as they have thrown out the leaves and are about four inches above the surface of the ground, a second covering is to be applied, so as to leave about two inches above the surface; and as they advance in growth, continuing to cover them in the same way, until the earth between the ridges elevates the drill at least twelve or fourteen inches in height. It is observed that the shoots that are made use of in this way should be strong and vigorous, about five or six inches in length, and planted while perfectly fresh and in a state of full growth. In respect to keeping the shoot sets, they may be preserved for planting by taking them off from the potatoes either at once or occasionally as they are wanted,

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without bruising, and placing them across upon each other, spreading a light covering of earthy materials over them. By this means they may be kept a month, six weeks, or longer, until the land is in a proper state of preparation for their being planted out. Another method has likewise been proposed for raising this sort of root, which is that of transplanting such young plants as have come up by chance on grounds that have had this sort of crop, or been prepared for the purpose, in beds of rich earth, or mould and dung, or by planting seed in dung-hills a few weeks before they are set out. However, as much injury must be done to the shoots of the young plants in the taking them up, and as this sort of root seldom grows well after being transplanted, it is probably a method of planting that can seldom or ever be practised with benefit, unless it be in the filling up the rows, when broken and defective, or in procuring more early crops, whether in the field or garden practice of cultivating such sorts of crops. But whatever methods are employed in putting them into the earth, it has been stated that it is necessary that the greatest care be taken not to deposit the sets to too great a depth in the soil, as the potatoe root has a tendency always to rise towards the surface of the ground; three, four, or five inches at most is sufficient in all the light dry sorts of soil, and in those of a moist and heavy nature less may be fully adequate to the purpose. And another circumstance deserving of much attention in the planting of this useful root, is that of all the sorts of sets being set in and covered by such mould as is in a fine state of friability and mellowness, as when the earthy material by which they are covered is of a lumpy and un-reduced quality, the crops are never found to be so fine or so productive. Many facts of this nature have been mentioned by writers on husbandry. Some likewise suppose that where this sort of crop is planted in the row method on a fine mouldy preparation of the land, without any manure being applied, or where it has been incorporated with the soil some time before, the drills should be made in a more light and shallow manner than where the common methods are pursued; otherwise mischief may be done by the sets being deposited to such a depth as to cause them to rot and be destroyed.

In the Lancashire original agricultural report, it is stated, in respect to the raising of early potatoes, that upon the same ground from which a crop has already been taken, the early seed potatoes are in some places afterwards planted; which, after being got up about November, are immediately cut up into sets, and preserved in oat shells, or saw-dust, where they remain till March, when they are planted, after having had one spit taken off, and planted with another, of a length sufficient to appear above ground in the space of a week.

But that the most approved method is, to cut the sets, and put them on a room-floor, where a strong current of air can be introduced at pleasure, the sets laid thinner, as about two lays in depth, and covered with the like materials, (shells or saw-dust,) about two inches thick; this screens them from the winter frosts, and keeps them moderately warm, causing them to vegetate; but at the same time admits air to strengthen them, and harden their shoots, which the cultivators improve by opening the doors and windows on every opportunity afforded by mild soft weather; they frequently examine them, and when the shoots are sprung an inch and a half, or two inches, they carefully remove one-half of their covering, with a wooden rake, or with the hands, taking care not to disturb or break the shoots. Light is requisite as well as air, to strengthen and establish the shoots; on which account a green-house has the advan-

tage of a room, but a room answers very well with a good window or two in it, and if to the sun still better. In this manner they suffer them to remain till the planting season, giving them all the air possible by the doors and windows, when it can be done with safety from frosts; by this method the shoots at the top become green, leaves are sprung, and are moderately hardy. They then plant them in rows in the usual method, by a setting-stick; by this method they are able to bear a little frost without injury. The earliest potatoe is the superfine white kidney; from this sort, upon the same ground, have been raised four crops; having sets from the repository ready to put in as soon as the other were taken up; and a fifth crop is sometimes raised from the same lands the same year, of transplanted winter lettuce. The first crop had the advantage of covering in frosty nights. It is remarked that this useful information was communicated by I. Blundell, of Ormskirk, and has hitherto been known only amongst a very few farmers.

In the neighbouring district to the south, in the mild warm tract about Wirrall, there is also an improved practice in raising the early kinds of potatoes, which has some resemblance to the above. In this situation the potatoes which are designed for the sets are got up in September or the following month, or even before; the sooner after they are mature, the better; and in November are laid up in a warm dry room, where they are spread rather thinly, not more than two, or at most three potatoes in thickness, and covered with wheat chaff, or dry sand. They are further protected from frost, whenever it is necessary, by a blanket or rug spread over them. By this mode of management, they are generally well sprit by the month of February or the beginning of the following one; but if this should not be the case, the sprouting is accelerated by sprinkling them from time to time with a little water. A potatoe is said to be well sprit, when it has a shoot from two to four inches long, as thick as a small quill, and terminated by two little leaves. In this state they are planted whole; all the shoots being cut off, except one, as early in February as the season will allow; they are set not more than five or six inches asunder, the tops just within the ground. As long as there is any danger from an exposure to the frosts, they are carefully protected by a covering of straw or pease-haum; which is taken off in the day, unless the weather be extremely severe, and put on again at night. By these means it is asserted that potatoes are now as plentiful in the Liverpool market, in the middle of May, or even sooner, as they were, before they were practised, in the middle of June. At the same time the culture of this vegetable is productive of very considerable profit to the farmer; a second crop being, in almost every instance, raised from the same land in the same year.

And it is stated by Mr. Marshall in his Rural Economy of Yorkshire, that in raising potatoes from seed there, the following method is pursued.

In autumn, when the apples are beginning to fall spontaneously, they are gathered by hand, and preserved in sand until spring, when they are mashed among the sand, or among fresh mould, separating the seeds, and mixing them evenly with the mould. As soon as spring frosts are judged to be over, they are sown in fine garden mould, and as fast as the plants get into rough leaf, and are strong enough to be handled without injury, they are transplanted from the seed-bed into another bed of fresh, rich mould, in rows, which are kept clean during the summer. In autumn bunches of small potatoes are found at the roots of these plants, varying in size the first year, from the hazel-nut to the crab. These being planted next spring produce potatoes

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of the middle size; but they do not arrive at their fullest bulk until the third or the fourth year.

Where the use of the stove or the garden-frame can be had, this process may be shortened. The seeds being sown within either of these, early in spring, the plants will be fit to be planted out as soon as frosts are gone; by which means the size of the roots will be much increased the first year; and will, in the second, rise nearly to perfection. And it is added that potatoes raised from seed are a miscellany of endless varieties. Sometimes these varieties are planted miscellaneously; sometimes particular varieties are selected.

In selecting varieties from seedling potatoes, two things are to be attended to; the intrinsic quality of the potatoe, and its productiveness. If these two desirable properties can be found in one plant, the choice is determined. To this species of attention and industry we are indebted for the many valuable kinds, which have been, and now are, distributed throughout the island.

It is observable, however, that varieties of potatoes, like those of corn, are partial to particular soils and situations. Hence the propriety of husbandmen raising potatoes from seed; as by this means they obtain, he says, with a degree of moral certainty, a sort adapted to their own particular soils and situations.

In Cheshire, it is remarked that the various kinds of potatoes which were formerly known and cultivated, are now almost totally lost; and that other kinds have been substituted by raising new varieties from seed. And in doing this, some mystery is pretended; but it is clear, that, in truth, there is none. The potatoe apple is gathered when ripe, and is kept dry during the winter; the seeds are sown in the spring, and the plant transplanted, after it has obtained a certain size. The varieties thus produced are infinite; but their real value is never perfectly ascertained during the first year or two of their cultivation. This is only known by time and a full trial of them. It has likewise been noticed, that the produce from seed partakes frequently of the qualities not only of the mother plant, but of other kinds which may have been propagated in the neighbourhood. And farther, that a singular idea is prevalent here, among many who cultivate this root, that by planting the green tubers, which sometimes proceed from the stem, the sort is renewed, if wearing out; but upon enquiry no facts sufficiently substantiated to confirm the opinion have been found. Besides, T. A. Knight, esquire, a gentleman of superior information on this subject, expresses it as his decided opinion, that no benefit can possibly arise from the pursuance of such a practice.

Also, in answer to a query put to the same gentleman by Mr. Wilbraham, whether artificial heat might not be of use in raising potatoes from seed, as this plant was originally a native of a warmer climate than our own; he states it as his practice to raise them in a hot-bed, to harden them by degrees, and plant them out in May; by which means he has had a very considerable produce even the first year. He has likewise discovered a method of making the early kinds of potatoes blossom and bear seed, which they do not in general. This is effected by planting cuttings from the roots at the foot of a strong stake, and washing away the mould from the base and the stems, whence the tubers would have sprang.

A conjecture is also offered by the same person, that varieties of the potatoe, still earlier than those now in cultivation, may be obtained; and that it might be expedient to attempt this by the insertion of the farina into a larger, and moderately early variety, with the view of producing an early kind of a larger size. If success attended such an experiment,

its utility would be very great; as in the event of a failure in the corn crop, the planting a small additional portion of land with potatoes would afford a very seasonable relief during the summer months, when the grain is usually at its highest price. These opinions may be seen more fully explained in the various papers of the same writer, inserted in the Transactions of the Philosophical Society; those of the Society of Arts; and in the Transactions of the Horticultural Society.

After-culture.—There cannot be any doubt, but that by proper attention to the keeping the crops of this kind in a suitable state of cleanness and culture, after they have been put into the soil, much advantage must result both in the goodness and abundance of the produce. The manner in which this is effected is different, according to the mode in which the crops have been planted and the nature of the land. It is, however, mostly applied, by hoeing with the common or horse-hoe, and by hand-weeding. The first is the method usually followed where the old modes of planting are practised, the second where the drill system is had recourse to, and the last occasionally in both cases. The horse-hoeing mode has been applied on the principle of saving a part of the expence of hand-weeding the crops, as well as with a view of promoting in a more effectual manner the growth of the roots. It is admitted by the advocates of this husbandry that there are more plants in the old practice; but they contend, that the tillage by the use of the plough, is so much more complete and effectual than that of the hand method, and the admission of air among the plants so much more free and extensive, that the loss in respect to number is much more than supplied by the augmentation in size. But whatever may be the advantages of the drill culture in this sort of crop, there cannot be any dispute, but that the finer and more loose and mellow the mould is kept during the time in which the plants are forming their wires and knobby roots under the ground, by frequent stirring, the better and more abundant the crops must be, from their growth and distention being more perfect and complete.

With the intention of effecting these purposes in the best manner, it is the usual practice in those districts where this root is much cultivated, to have recourse at different times to such means as are capable of cleaning, mellowing, reducing, and bringing up to the roots of the plants the fine mould which has been in this way produced. And the implements commonly made use of in this intention, are the harrow and the hoes just noticed, by the first of which the particles of the soil are broken down and reduced into a fine state, and by the latter laid up to the roots of the plants.

In the ninth volume of the Bath Papers, it is stated that the potatoe land is harrowed, when the growths from the sets under the surface are about an inch long; this can be known only from inspection. It is impossible to say, in how many days it will happen after their being planted, as it will depend on a variety of circumstances; such as the season of planting, the quality of the soil, the state of the weather, the kind of potatoe, the nature and quantity of the manure, &c. Harrowing potatoe land destroys the first crop of weeds, and creates a fine pulverized soil for the plants to feed in, when they arrive at the surface. And by delaying this operation till the above time, the vegetation of the weed is more advanced, and consequently more effectually destroyed; but by delaying it much longer there would be a danger of breaking off the potatoe shoots. The harrow used by the writer is a folding-harrow, invented by himself, drawn in the intervals by a single horse; it applies stuff to the opposite side of two contiguous rows, destroys the weeds, and pulverizes the soil without levelling the row, which would tear up many

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of the potatoes, or break off their shoots, and deprive the land of the advantages it has, by lying dry when the shapes of the rows are preserved. A lighter harrow, on the same plan, is employed in smoothing the rows intended for turnips and other small seeds, immediately before they are sown. When the potatoe plants are all early seen, the earth and weeds are removed from them, going as near as possible to them with a shallow furrow, and turned into the middle of the intervals by a horse-hoe; which is the same with the writer's large plough, on a smaller scale, with a very narrow earth-board. If it be done sooner, there will be danger of tearing away those which are not seen, if the hoe be allowed to come near enough to the rest. If it be delayed longer, there will not be the same benefit derived from horse-hoeing. Any weeds and grass which shall have escaped the plough, both now and to the time of taking up the potatoes, are carefully to be pulled up by the hand. And in a few days after the first hoeing, the same instrument is to go deeper in the former track. This stirring will make the earth in the intervals free, that has been trampled down by the weeders, and it will bury the weeds they have pulled up. When the weeds, buried in the intervals, are rotted or converted into vegetable food, the earth is returned to the plants with a double earth-board plough, going twice in the same track with a shallow furrow; the first of these times down hill, if the land be hilly, a boy following the plough to uncover any plants that have been buried in the row; for, if left in that situation, their growth would be entirely stopped, or very much retarded. If, by avoiding to bury the plants, they should be left in some places without the mould touching them, it is drawn towards them in those places with a hand-hoe. And that when the plants are about six inches in length, the earth is raised higher towards them, by the double earth-board going twice in the track of the former earthings, but much deeper than before; which finishes the horse-hoeing of the crop.

Mr. Young advises that, some time in May, the early planted potatoe crop should have a hand-hoeing, which should be done with good attention, that not a weed may be left, and the surface of the land be left well cut, and in fine order. And that the crops in rows should receive, besides this hand-hoeing, the first horse-hoeing, which should be given with a common swing-plough drawn by two horses, one before the other, and turn a furrow from the rows, throwing up a small ridge in the middle of each interval. These operations should be well and attentively performed; for the weeds grow at a great rate, and, without such an attention, will destroy, or at least greatly damage the crop. And another hand-hoeing should be given in June, and so effectually executed as to render any succeeding ones unnecessary, as the plants may be so grown as to be injured by it. The crops planted for horse-hoeing must also have that operation now again performed with the double mould-boarded plough, splitting the ridges before thrown up, and applying them to the rows in an equal manner. And in July, in some cases, the crops in rows should have a third horse-hoeing. But that the common mode of ploughing backwards and forwards every time of performing the operation is not well suited to the crop; as cutting the roots when the plants are in full growth hurts the crop, and destroys the runners that would afford potatoes. The third horse-hoeing should therefore be executed with the shim, which loosens and cuts the surface of the ground, without turning it over or forming any ridge. Some of these tools work with many little triangular shares, others with single flat ones, and still others hoe with coulter; however, any that cut up fresh mould at the bottom of the furrows do very well. They should be fol-

lowed, in about a week, by the double mould-board plough, striking the furrows, and throwing up all the loose mould to the ridges, banking them up. This is useful by affording fresh mould for the roots to shoot into, which is better than the practice of taking it away from them, when they have begun to advance in growth. And in August the rows of this sort of crop should be hand-weeded when necessary, as it is probably too late to horse-hoe them. But when the intervals are very weedy or much bound, or the plants not sufficiently earthed up, he advises the shim to be carefully run through them to destroy the weeds and loosen the earth, so as that they may be stricken clean by the double mould-board plough, and well earthed up for the wiry roots to extend into and increase the produce.

And this sort of crop is shewn to have attained a sufficient degree of ripeness, as well as full size, by the decay of the leaves, and their dropping off the stems. And they should be taken up as soon as possible after the appearance of frost in the autumn, as in the latter end of September, or beginning of the following month at latest.

Taking them up.—In the taking up of potatoe crops, the modes that are followed are different according to the nature of the culture under which they have been managed; when they have been planted in drills, and horse-hoed, the common method is, first to turn a furrow from each side of the drill, and then to turn over with the plough that part of the drill in which the potatoes are lodged, and which are afterwards gathered by women and children hired for the purpose. Sometimes the middle part of the drill, after the two-side furrows are taken from it, is turned over by men with three-pronged forks. In other places the three-pronged fork entirely supplies the place of the plough, which is never introduced. Where a sufficient number of women and children can be procured for gathering the crop, using the plough is certainly the most expeditious and least expensive mode. In order to avoid the risk of cutting the potatoes with the coulter, it is commonly taken out, and the plough with only a share, or fock, is used for turning over the middle part of the drill, which, as it performs the operation as effectually, is no doubt an improvement, and may be considered the best implement that can be used in taking up a crop of horse-hoed potatoes. When potatoes are planted with the spade or the plough, and with an intention of hand-hoeing the crop only, the common method of taking up the potatoes is with the spade, one gatherer attending every person who is employed in turning over the ground. Crops of potatoes thus cultivated, are sometimes, however, taken up with the plough. When that happens, it is found necessary to plough the field two or three times over, otherwise it is scarcely possible to get the crop properly collected. Mr. Campbell remarks, that in his district the roots are taken up with a fork with three prongs. And that, to make this operation easier where the land is stiff, the outside of the row, in which there are no potatoes, is pared away by going round every other row with the horse-hoe, and when these are dug, returning to the remaining ones; that is, the earth is removed from the 1st, 3d, 5th, 7th, &c. and when the potatoes are taken out of these, it is removed from the 2d, 4th, 6th, 8th, &c. The injury done to the roots by the plough and harrow, and the great number unavoidably left in the foil, is not, he supposes, compensated by the saving of time and labour in taking up with those instruments.

Mr. Young, however, thinks, that there is not the same reason for digging up this crop as for carrots; the plough among the latter is apt to cut, break, and bury them; but not so with potatoes, for it turns them over, damaging scarcely any. In performing this work, first, says he, let
a number

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a number of women, preceded by a cart, pull up the tops, and throw the potatoes that adhere to them into baskets, and the stalks into the carts, which should convey them to the hog-yards, where they will presently be trampled into dung: then each plough taking its ground, attended by six or eight women, or more, if the crop is very large, each with a basket, divide the furrow, by setting up white sticks into as many parts as there are women, that each may pick her own share; a range of bushel skeps being placed at a small distance, for the baskets being emptied into, and three or four carts ready for men who do nothing else, one to eight or ten women, to take the skeps to the carts. The furrow being picked, he used many years ago to work it with men with three-pronged forks, each with a woman, or boy, to pick up the roots; but finding this expensive, he contrived a diagonal harrow in a slim beam, with two or three teeth, drawn by one horse, which tears the furrows in pieces, and lays bare the mass of the crop: the women then pick again; and another common cross-harrowing, with a second ploughing and harrowing, all three attended with two women to each plough, will finish the business, and clean the roots all away; so that he has found the pigs, when let in, make but very poor gleanings. The use of the little harrow saved him from 14s. to 20s. *per acre* in labour, which would otherwise have been necessary. An implement of this sort is shewn in the plate on agriculture, under the title of *Potatoe Harrow*.

Storing.—As soon as potatoes are gathered they should be allowed to remain some days to dry, before they are stored up, as it will give them a much better chance of keeping. There are several ways of storing up potatoes; the best is certainly that by which they can be kept most effectually dry, and at the same time free from the influence of frost. Putting them into close houses, and covering them well up with straw, is the most effectual mode, and that which is generally adopted. In Lancashire, and some parts of Scotland, it is a common practice to dig pits in the potatoe field, when the soil is dry and light, and, putting in potatoes to the depth of three or four feet, to lay a little dry straw over them, and then cover them up with earth, so deep that no frosts can affect them. Another method, which is practised in England as well as Scotland, is to put them together in heaps, and cover them up with straw, in the manner for preserving turnips, with this addition, that the heaps are afterwards well covered with earth, and so closely packed together as to exclude frost. The farmers in Lancashire sort and separate their potatoes in the course of taking them up, according to their sizes, and are particularly careful to throw aside all those that are spoiled before raising, or that are cut in the taking up. This is a very necessary and proper precaution, (although by no means generally attended to,) as the crop must have a much better chance for keeping, than when diseased or cut potatoes are stored up with it. It is also of great advantage to have the work performed in a dry season, as the potatoes seldom keep well when taken up wet, or when placed in any sort of repository for keeping while in that state. But the best way of storing the roots is, Mr. Young says, in what are called potatoepies. A trench, one foot deep and six feet wide, is dug, and the earth clean shovelled out, and laid on one side; this has a bedding of straw, and the one-horse carts shoot down the potatoes into the trench; women pile them up about three feet high, in the shape of a house-roof; straw is then carefully laid on six or eight inches thick, and covered with earth a foot thick, neatly smoothed by flat strokes of the spade. In this method he never lost any by the severest

frosts; but in case of its freezing with uncommon severity, another coat of straw over all gives absolute security.

But these pies, when opened, should each be quite cleared, or they are liable to depredation. To receive one at a time, besides also being at first filled for immediate use, he has a house that holds about 700 bushels, formed of posts from fir plantations, with wattled sides, then a layer of straw, and against that earth six feet thick at the bottom, and eighteen inches at top; the roof flat, with a stack of beans upon it. This he has found frost tight. The beans keep out the weather, and yet admit any steam which rises from the roots, which, if it did not escape, would rot them.

However, besides these, there are several other modes of preserving potatoes in use in different places. In Rutlandshire, Mr. Marshall says, the method of laying up potatoes, is, universally, that of *camping* them; a method somewhat similar to the above, but which requires to be described. Camps are shallow pits, filled and ridged up as a roof with potatoes; which are covered up with the excavated mould of the pit. This is a happy mean, between burying them in deep pits, and laying them upon the surface. The camps are of various sizes; being frequently, too, made in a long square form like a corn-rick, and of a size proportioned to the quantity to be laid up. It has, however, been found, by experience, that when the quantity is large, they are liable to heat and spoil; much damage having sometimes been sustained by this imprudence. Experienced campers hold, that a camp should not be more than three feet wide, (four feet is, perhaps, as wide as it can be made with propriety,) proportioning the length to the quantity; or, if this be very large, forming a range of short ones, by the side of each other. The usual depth is a foot. The bottom of the trench being bedded with dry straw, the potatoes are deposited; ridging them up as in measuring them with a bushel. On each side the roof, long wheat straw is laid, neatly and evenly, as thatch; and over this the mould, raised out of the trench, is evenly spread; making the surface firm and smooth with the back of the spade. A coat of coal ashes is sometimes spread over the mould; as a still better guard against frost. It is needless to observe, that a camp should have a dry situation; and that the roots ought to be deposited in as dry a state as possible. These camps are tapped at the end; some battens, or a quantity of loose straw, being thrust close in the opened end, as a bung or safeguard.

And as it is a matter of the highest importance, to preserve this root without spoiling the whole year, it has been suggested, that the best method yet discovered for keeping potatoes sound for the longest period, is to spread them on a dry floor early in the spring, and to rub off the eyes occasionally, as they appear to have a tendency to push out; by using these precautions, Mr. Donaldson has frequently seen potatoes kept in good condition till the month of June.

The following is an ingenious method of procuring a supply from the new crop, which merits attention. It is to take up carefully with the hand the potatoes that lie nearest the surface; this, in place of injuring the crop, will rather improve it. If this practice were generally adopted by the poor people, who are often obliged, from necessity, to have recourse to the new crop at a very early period, and to dig up a considerable part of it before it comes to maturity, that diminution of the crop would, the above writer says, be in a great measure prevented.

Diseases.—Potatoe crops are exposed to the attacks of disease, and that of the *curl* or *blight* is the distemper to which this plant is most liable. It shews itself very early

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in the season, by a curling in the leaves, and sometimes to such a degree, that whole fields are rendered thereby in a great measure unproductive. The cause of this disease is not yet perfectly understood, but the remedies most likely to prevent the evil, are those of frequent changes of seed, using large sets, cultivating and manuring the land in a proper manner, and not repeating this species of crop too often on the same land.

Mr. A. Knight says, that the disease of curled leaves in potatoe crops, appears to be occasioned by moulding the plant; and that the way to prevent it is, to allow the potatoes to remain in a moderate heat during the winter; somewhat late in the spring they begin to shoot; let these young shoots be taken off, when two or three inches long, from the tuber, and planted as sets, and the plants thus afforded will be entirely free from the curl.

These sorts of crops have likewise enemies of other kinds, which attack them in their growth; the fly called the thousand legs sometimes eats and makes them scabby, and the large bottle-green grub often eats out the hearts of them. See CURL.

Expences of Raising and Produce.—The expences of cultivating, and the produce of this sort of crops, have been differently stated, and they must obviously differ greatly, according to the soil, and the manner in which they are grown, as well as other circumstances that attend them.

In the Report of the West Riding of Yorkshire, Mr. Brown, in 1799, states them in this way.

Expences upon an Acre of Potatoes.

	£	s.	d.
Land rent	1	5	0
Working and ridging	1	5	0
Six sacks of potatoes at 7s.	2	2	0
Cutting ditto. and setting	0	2	0
Manure and leading	2	2	0
Hoeing, weeding, and taking up	1	5	0
	8	1	0

Produce of an Acre of Potatoes.

Sixty sacks at 5s. 6d. per sack	16	10	0
	8	1	0
	8	9	0

It is supposed, that the small that dresses out of what is shipped to London, will deliver them, or rather more. And in the North Riding of the same district, from 200 to 300 bushels per acre are stated to be considered as a good crop of the sorts for the table, and that those kinds raised for the purpose of cattle, will generally afford more by 50 or 100 bushels, on the same extent of land. And the same is considered as a good produce in the Lancashire mode of cultivating the root.

In the county of Essex, about the town of Ilford, the common calculation of the expence of producing an acre of potatoes is about fifteen pounds, which may be made out somewhat in this way.

	£	s.	d.
To rent, tithes, and rates	2	2	0
To manure	4	0	0
To tillage	0	13	0
Carry over	6	15	0

	£	s.	d.
Brought over	6	15	0
To fifteen cwt. of seed potatoes, at 5s.	3	15	0
To cutting, at 4d. per cwt.	0	5	0
To planting	0	8	0
To two hoeings	0	8	0
To digging up, 6d. a rod	4	0	0
	15	11	0

This is exclusive of the expence of picking, sorting, packing, and carrying to the market. The prime cost to farmer in his barn 50s. a ton, at ten tons an acre; at seven tons and an half, 40s. a ton, or 1s. 3d. a bushel: six tons at 4s. per cwt., which is 24l. per acre, will leave a good profit; but crops will rise much higher, and the price likewise. It is evidently an exceedingly profitable culture; and when the wheat is considered, will be found to rank amongst the most advantageous classes of British agriculture, according to the opinion of the writer of the Corrected Agricultural Report of the district.

In Young's Survey of Norfolk, it is stated that Mr. Cubit, at Cutfield, had an acre two years ago which produced forty-eight sacks, at 6s. a sack.

In Cheshire, the produce of those crops of potatoes, which acquire their full growth, varies from one hundred and fifty to two hundred and fifty bushels, of ninety pounds weight each, on the statute acre. The pink eyes generally give the smallest, the ox noble the largest produce. But there is a great variation in different places, as in the Altringham district; three hundred bushels the acre is only considered a fair crop.

In Lancashire, the produce of these sorts of crops is from two hundred and fifty to three hundred bushels, and sometimes even so high as three hundred and fifty and four hundred bushels.

In Essex, from two hundred to three hundred bushels, and occasionally more. About Ilford, when the crops stand to full perfection, the produce is from eight to fifteen tons on the acre.

F. Kirchaffer, esq. of Dublin, in a paper in the fourth volume of Communications to the Board of Agriculture, observes, that of the seed potatoes that were planted in a field, there were just 32 hundred-weight, which he procured from the south of Scotland, at a very considerable expence. These were a clean white and good kind, a little flattened, and had been raised in a moist soil. They were planted in some of the drills. Some were planted with white seed, raised in the bog of Allen; some were also planted with black, and a few with very fine apple potatoes, from the same quarter. The remaining drills were planted with white, black, and apple potatoes, all of which had been raised on land very similar to that in which they were now put; in fact, had grown in the very next field. He found that in their growth the Scotch seed made the earliest, and by much the most luxuriant shoots; the bog's whites and blacks were the next best; the home blacks and bog apples were the next; and the home apples were the worst of all. It is added, that as the Scotch whites were the earliest, so they were the first that were dug out; and here the produce was astonishing to the workmen, and to numbers of strangers who came to see the digging. They lay in the drills like hanks of onions, from the bottom, on which the seed had been laid, to the crown. There was very little difference in their sizes, none either remarkably large or small; and they turned out of the ground as clean and beautiful as possible.

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possible. A great number of the roots produced from two to three and four pounds each, and several were more abundant. He had scales brought to the field; and before respectable witnesses, six perches of each kind of potatoes were dug out of the drills, three of which were such as were supposed to be the best, and the other three the worst; but in fact they seemed to be pretty equal. The weights of the produce of the six perches of each kind were as below:

Produce *per* Perch, of seven Yards.

Sorts.	lbs.	which averaged	lbs.	
The Scotch whites	312		52	each perch.
Bog whites	246	—	41	ditto.
Bog blacks	210	—	35	ditto.
Bog apples	138	—	23	ditto.
Home whites	192	—	32	ditto.
Home blacks	162	—	27	ditto.
Home apples	108	—	18	ditto.

And as all the drills were 38 perches long, and 5 feet distant from centre to centre; of course they were 18 times 38 perches of drills in an Irish acre, or 684 perches of 7 yards running measure. This number, multiplied by the average of each sort of seed produced in a perch, gives the acreable produce of every kind in pounds, which, reduced into barrels of two hundred and a half, is as follows, viz.

The Scotch whites gave 126 of these barrels *per* acre.

Bog whites	100 barrels.
Bog blacks	85 barrels.
Bog apples	56 barrels.
Home whites	78 barrels.
Home blacks	66 barrels.
Home apples	44 barrels.

But Mr. Donaldson says, that the multiplicity of weights and measures, by which potatoes are sold in the various market-towns in the kingdom, renders it almost impossible to give an accurate account of the value of the crop by the acre. It varies, he supposes, in weight from five to eight, and sometimes ten tons: probably the general average may be nearly six tons the English acre. The medium price of potatoes shipped at Dundee has been, for some years, about 35s. the ton, equal to 10l. 10s. the acre.

These roots may be readily sorted, by having recourse to a sort of wide riddle made for the purpose.

Application as Food.—It has been stated that this sort of root, joined with hay, straw, chaff, and other similar matters, has been found useful in many cases, especially in the later winter months, as a food for horses, cows, and other sorts of live stock; and with these substances, as well as in combination with other materials, as bean or barley-meal and pollard, in the fattening of neat cattle, sheep, and hogs. But as there is considerable trouble and expence in preparing them, it being found that they are much more safe and nutritious for such animals when boiled, they do not appear to have paid greatly, when employed in this way. The results of numerous trials, detailed by different writers in the Annals of Agriculture, do not shew them to have been in this mode of application worth more, in general, than from 4d. to 5d. the bushel. When given to horses, it may be something more, as there is more difficulty in ascertaining the savings in other articles of fodder that are thereby made, and the advantages that are gained by the animals: it has been stated to be about 10d. the bushel.

It is stated in the Cheshire Corrected Agricultural Report, that when the crops are favourable, very considerable quantities of the potatoes raised about Frodsham, and particularly of the ox-nobles, are given by the farmers in the neighbourhood to different kinds of stock; feeding cattle,

milch cows, horses, hogs, sheep, &c. The success which has attended this practice, and the extent to which in many instances it has been carried, renders it, in the writer's opinion, an interesting subject of inquiry. Mr. Antwis informs him, that he frequently applies not less than 2000 bushels of potatoes in a year to this purpose; and states it as his opinion, that it is as good, if not a better, food for cattle of every description than turnips. This, however, is by no means the general idea on the subject. Some variety of opinion exists there as to the most eligible manner of giving this root; whether boiled, which may be done either in steam or water, or unboiled. Both of these modes are practised, and have their respective advocates. Cattle are more partial to the food in the former state: to horses, however, potatoes are frequently given raw, among other provisions of the provender kind, and answer extremely well in this way. An addition of chaff, or rough oats, is commonly made to counteract their laxative effect; about two quarts of this provender being usually mixed with six pounds of potatoes, and so on in proportion. And it has been remarked to the writer, by a gentleman whose opinion on this subject is entitled to great deference, that, if eaten raw, potatoes are much the most nutritious, when they have begun to sprout. This certainly holds good in the instance of barley and malt, and, in all probability, may be further extended to other vegetables secreting a saccharine juice at this period.

They are applied to the same purposes, and in much the same ways, in many parts of Essex; but some do not approve of them raw, as they are liable to scour too much. Mr. Pittman, an extremely large cultivator of them, finds nothing better for fattening bullocks, hay being given at the same time. They are also excellent for cows, and will fatten hogs very well, with a small mixture of barley-meal.

J. C. Curwen, esq. M.P., in a paper in the fourth volume of Communications to the Board of Agriculture, observes, that his former success in feeding horses with steamed potatoes and cut straw, has encouraged him to attempt to remove the only inconvenience he found attending it,—the length of time and labour requisite to steam any considerable quantity. He consumed last year at his works upwards of 60,000 stone. The washing was an operation of great labour, and, if not particularly attended to, was often ill done. But in a steaming-house, which he has contrived, there is a washing-machine, which will most completely clean eleven stone in two minutes, and requires only a trifling exertion.

He gives this statement of the expence of feeding his work and carriage-horses. The work-horses are employed from eight to ten hours, and, from the nature of their work, are obliged to travel quickly: these horses stood their work remarkably well the last year, and continue to do so at present. He began to feed with potatoes the 5th of October: to each horse is given daily one stone and a half of potatoes, mixed with cut straw, in the proportion as one is to ten.

	s.	d.
The average cost of potatoes 3d. <i>per</i> stone, one and a half	0	4½
Oats, at 2s. 4d. <i>per</i> Winchester bushel, weighing from 39 lb. to 40 lb., 8 lb. of ditto	0	6
Hay, at 6d. <i>per</i> stone, 7 lb. of ditto	0	3
Cut straw, 4 lb.	0	1
Steaming the potatoes	0	0½
<i>Per</i> day	1	3

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But horses of great draught, and such as cannot be allowed to rest at noon, will require 12 lb. of oats, which will make the cost of feed *per day* 1s. 6d. These horses consume rather less hay, but have double the quantity of cut straw with their oats, (which are bruised,) which makes the expence nearly equal. And the steaming 120 stone of potatoes requires two and a quarter Winchester bushels of coals = 137 lb., the weight of the bushel 61 lbs.

	<i>s.</i>	<i>d.</i>
The coals cost - - - - -	0	6 $\frac{3}{4}$
The labour costs - - - - -	1	8
120 stone steaming, at 1 $\frac{1}{4}$ d. - - -	2	2 $\frac{3}{4}$
	2	6
The difference	0	3 $\frac{1}{4}$

This 3 $\frac{1}{4}$ d. *per day* may be applied towards the first cost, and the necessary repairs of the machinery, and will in seven months amount to 2l. 16s. 10 $\frac{1}{2}$ d.

It is supposed that one acre of potatoes is equal to four of hay, and, under proper management, the ground will be in as good condition for wheat as if it had been under fallow. The potatoe crop will not in general pay the expence, but there will be a considerable saving in putting in the wheat, compared with a fallow, equal to 40s. *per acre*.

No pains have been spared in having the estimate made as accurate as possible; he has, therefore, taken the price of hay and potatoes on the average of common years. He has seldom, if ever, cut less than 300 acres of grass, and has found that quantity inadequate to his annual consumption; and has always been obliged to purchase hay, and has paid from 8d. to 1s. *per stone*, besides the expence of carriage, which would make the average cost 10d. *per stone*. On the whole, he is fully persuaded that work and farming-horses may be fed with potatoes at a much easier rate than with hay. The waste in steaming this root is about one-eighth part. And that lately straw has been substituted instead of hay, and the horses have kept their condition, and done their work equally well.

The baking of potatoes, for the purposes of feeding lean, and fattening other sorts of stock, has been suggested by Mr. Pierrepont in a letter to the Society for the Encouragement of Arts, as another and preferable mode of preparing this root, to that of the above. Not altogether satisfied, says he, with the system of curing or preparing potatoes by steam from heated water, which he had practised, and conceiving that some better method might be found out, he, in 1801, made several experiments, and bestowed much attention and trouble upon it, before he brought his plan to bear, which is that of having an oven, and a proper digester placed in it for containing the roots, which is shewn in the plate, on steaming, roasting, and preparing cattle food. It is observed that potatoes cured in this way are not near so apt to turn sour or scour the cattle, are more dry, so that the animals fed with them drink a deal more, and they become more hard when cold, so as to be flung to the stock with more convenience than when steamed. In 1802 the writer fattened fifteen brace of bucks chiefly with them. He says chiefly, as after the potatoes were gone, they had a few beans. They were very fine, and peculiarly fine flavoured. He also fattened the same year with them two oxen, three cows, and two pigs, which were equally well flavoured, particularly the first. The pigs had, towards the latter end, a few whole peas after each meal. The bucks had six pounds *per day*, each at an average. The lean deer in the parks do very well, with a little more than a pound

per day instead of hay. And this year (1803) he has fattened two very large oxen, and twenty Welsh wethers. The wethers, with which there were two South Down rams, and one ewe, had eighty pounds of the potatoes *per day*, with a little cut hay. The ewe was put with them, to teach the other sheep to eat them, she has since had twin lambs, and the bailiff acknowledges that the lambs do better than the other at turnips, though he, with some others, dissuaded the writer from trying more ewes, under the idea that the potatoes would dry up their milk. Four dairy cows never did so well with very good hay, as they did last winter, with about four pounds of potatoes, and about five pounds of rubbish hay and straw cut. One of the oxen weighed, on the 22d of March, 343 stones alive, upon a weighing machine; he had about forty pounds three times a day. It is observed by the earl of Egremont, that he knows nothing of the expence of preparing potatoes in this way; but they appear to him to be more nutritious than in any other mode of dressing, and much better tasted for the table. He adds that he did not think it possible to bring such large oxen to such a state of fatness upon potatoes. In the feeding of milch cows, they have been found useful in some cases, even when given without being prepared by being exposed to the heat of boiling, or any other means.

And they are stated by Mr. Young to be sometimes given to horned cattle in the cribs that hay is given in. Giving hay in the morning, about ten o'clock potatoes, at noon hay, about two o'clock potatoes, and at night hay. An ox of one hundred and forty stones (eight pounds to the stone) will eat one bushel and a half *per day*; from eighty to one hundred stones, one bushel, with about ten pounds of hay; they will not eat much hay if they have that quantity of potatoes. They get very fat cattle with hay and potatoes. Mr. Clofe also states, that he has, for several years, kept his hogs entirely upon his refuse potatoes, and can always, without difficulty, or the expence and trouble of confining them, sell those of about seven or eight stone weight, to the butchers, for roasting meat, at 4s. 6d. *per stone*; pork fed in this method is remarkably sweet, the flesh delicate and moist. This food succeeds admirably, except for bacon-hogs, and he finds, from experience, that it is necessary to keep those intended for that purpose about a fortnight upon ground pease mixed with boiled potatoes. If the hogs are forwarded with potatoes before they are confined, two bushels of pea-meal, and four bushels of boiled potatoes, well incorporated, will fat a hog of twelve stone, fit for hams or bacon; this method greatly reduces the expence commonly attending the fattening of swine. The best way is, however, to give this sort of food to the store hogs.

In the survey of Norfolk it is observed that Mr. Repton has raised potatoes for the consumption of his farm; but not when he has any prospect of buying them, which he has done at 1s. 6d. to 2s. 6d. a sack. He steams them for young cattle, &c. having a very complete apparatus for the purpose; boils five coppers, which steam 50 or 60 bushels a day, and answers well; also turnips, and pours their liquor on to cut chaff, giving the whole mixed together; it answers extremely well; the cattle licking it up with great avidity, and doing perfectly well on this food.

And Mr. Newman of Bayford, Hertfordshire, has fed cattle on potatoes, but as they were too watery, they would not answer; he therefore left off the practice. But Mr. Rooper, of Berkhamsted, who has usually had four or five acres for fifteen years past; thinks very differently from Mr. Newman, and uses them raw for fattening beasts, as he assures Mr. Young, with much success; for hogs also they answer very well. He plants them after oats in every

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third furrow; and ridges up the stubble soon after harvest; he harrows it down in the spring, and spreads eight loads of long fresh dung *per acre*; then plants near 20 bushels *per acre*; he horse-hoes and ploughs up the crop, which produces from 150 to 200 bushels *per acre*, on a flinty loam, on a chalk bottom. Wheat will not do after them; but the barley is good. They are, he is clear, a very exhausting crop.

And Mr. Hill has a field of uniformly light sand loam, on the ridge or highest land in the parish of Kempton, containing about two acres and three quarters; this field was cropped with potatoes in 1794, when he saw it, and the year before produced about 400 bushels *per acre*, worth on the average 1s. 9d. *per bushel*, 35l. *per acre*; every attendant expence about 5l., 30l. clear. He fed his milch cows and store pigs with the potatoes in winter; the cows gave abundance of milk, but not cream in proportion.

According to the first of the above writers, by much the most general as well as the most useful application of this sort of crop is in that of human food, for which purpose the roots are rendered mealy, nutritious, and fit for undergoing the different processes of digestion, by means of heat, either dry, or in water, or steam. Their acrid juices being in this way converted into mucilage, and probably some portion of that into a fine farinaceous or starchy substance. Experience seems to prove, that where the heat is properly applied through the medium of steam, the potatoes become more mealy and nourishing than where water is made use of for the same purpose. But the differences in the mealiness produced by the boiling of this root is supposed by some to depend more upon the nature of the soil on which it is grown than on any other circumstance. And it has been suggested by Dr. Darwin, that the mealiness of some potatoes that have undergone the operation of boiling, may be sometimes affected by the acidity of the water in which they have been boiled; but it is believed to depend more generally upon the mucilage in some of them being more coagulable than in others, a circumstance the cause of which has not yet been fully investigated.

Washing.—The cleaning of this root, where it is made use of upon an extensive scale, is frequently considered as a troublesome operation; it may, however, be performed with great ease and convenience, by having a vessel constructed in the form of a barrel, with small strong narrow laths on the sides nailed to the solid boards, forming the ends at such distances as may be sufficient for preventing the potatoes or other roots from falling through, and at the same time for admitting the water to pass freely. The potatoes are to be introduced and evacuated by means of a door fixed in one of the sides. The vessel being thus prepared it is to be hung upon a frame of wood over a large square tub containing water, in such a manner as that about one-half of it may be immersed; a crooked handle projecting at one of the ends, by quickly turning which, when the potatoes are put in, a large quantity may be expeditiously washed. There should likewise be a contrivance in the frame higher up and nearer the side of the cistern for lifting the barrel from the place in which it turns into, in order that, by opening the door and turning it round, the washed roots may be easily delivered into a barrow or other vessel placed below, so as that it may receive them. A more expeditious mode of doing this may be seen under the head *steaming and washing apparatus*.

Effects on Land.—In regard to the effects which are produced on the soil by this sort of crop, it seems probable, the author of Practical Agriculture says, that both from the nature of the root and the large portion of manure that is

necessary to ensure a great crop, except under particular circumstances of the land, that the potatoe is a sort of plant that has a tendency to draw a large quantity of nourishment from the soil on which it is grown, consequently to exhaust and impoverish it in a considerable degree, though these injurious effects are in some measure counteracted by the great abundance of the stem and the closeness of the foliage, producing a stagnated state of the air, and a considerable deposition of vegetable and other matter on the surface, as well as by the pulverization and aeration that is afforded in the culture and removal of the crop from the ground. It is perhaps in this way only that the contradictory accounts of the effects of this sort of crop on the soil, and the occasional successive production of full crops on the same land, can be well reconciled. The experience of potatoe cultivators in general appears to support the conclusion; as upon more strong and heavy sorts of soil, where benefit can be produced in the above manner, full crops may often be taken in succession without much injury being sustained; while on the lighter kinds, where much less advantage is derived in this way, they become too open and exhausted for the successful repetition of this sort of crop, and even for the growth of wheat. And that in Mr. Young's trials with the potatoe, introduced in a great many courses of crops, it was found that the state of deterioration of the soil was in proportion to the frequency of the occurrence of such crops in the rotations. In the experience of the writer of the report of the North Riding of Yorkshire, this kind of crop does not impair the fertility of the soil on which it is produced; as he has always found that the crop of corn succeeding the potatoes, and the feeds after the corn have been equal to those succeeding a crop of turnips. And it is well known and generally allowed, that a well-managed crop of potatoes, leaves the soil in a mellow and more fertile state than any summer fallow, or any present mode of cultivation of any other crop. This arises from the frequent stirrings in the fore part of summer with the plough and hoes for the destruction of weeds; the thick shade of the plants which keeps a perpetual moisture in the soil, and the decay of so large a quantity of leaves and stalks, before and after the crop is taken up, all tend to enrich the soil. A question also arises on the food and support of this plant; do not all succulent plants derive a greater proportion of their nourishment from the atmosphere by their tops, than those of a drier texture? This, though not capable of proof, is probably the fact; and it is confirmed by the circumstance of all meliorating crops being of a more succulent nature, as beans, peas, vetches, turnips, and clover, than wheat, oats, or barley, which are exhausting crops.

The facts stated on this subject in the Hertfordshire report are these; Mr. Penrose, of Hatfield, has often sown wheat after potatoes, but very rarely gets a good crop; finding this culture, as the reporter was informed, a bad preparation for that grain.

Mr. Cassmajor, at North Mims, has cultivated this root, and has had considerable crops, but he uniformly found it so exhausting, that he could never get such crops of corn after them as satisfied him; he therefore gave up the culture. And Mr. Marsh, near Hatfield, a very improving farmer, has cultivated this root for some years: he manures with horse-dung; plants chiefly the champion sort, and gets 600 or 700 bushels *per acre*. He has had good wheat after these, but little crops of barley.

Mr. Hill, of Whittle, has generally four acres: he has had 1100 bushels on two acres and a half. He finds that giving them to store hogs is the most profitable application. His men dig up the crop with four-pronged forks, at 1d.

per bushel; which crop is easily measured by a fifteen-bushel cart. Mr. Roper finds them a very exhaulting crop.

Mr. King, of Barkway, has had wheat after potatoes, but not good crops: this year he will take barley, which he is well convinced is the most profitable management.

In Norfolk, Mr. Everit has found that they exhaust the soil more than any thing.

But the dispute respecting their effects on the soil may, Mr. Marshall supposes, perhaps, be settled satisfactorily in this manner. The potatoe contains, indisputably, a great quantity of nourishment; and is therefore, perhaps, as indisputably a great exhauster of the soil. But the quantity of vegetable nourishment carried off in the potatoe crop is not the only cause of exhaustion: it is notorious to common observation, that this crop leaves the soil in a singularly friable fertile state, causing an abundant produce of the crop which succeeds it. If taking the advantage of this prodigality of the soil, the husbandman keeps cropping it year after year with corn; and, when it will no longer answer his unreasonable expectations, lays it down to grass, it is no wonder that it should be unproductive: for, having lavished all its riches on an ungrateful occupier, it is, of course, reduced to extreme poverty.

On the contrary, if, after a crop of potatoes, well dunged for, only one or two crops of corn be taken, and the land be laid down to grass, while yet in a state of fertility, the potatoe crop is, to vulgar appearance at least, friendly to the crop which succeeds it.

Hence it follows, that land which has been cropped with potatoes should presently afterwards be laid down to grass, or should be timely replenished with a quantity of manure proportioned to the degree of exhaustion it has undergone.

The value of potatoes as a fallow crop, and as an article of food for cattle, compared with turnips and cabbages for the same purposes, may be considered thus: potatoes are more nutritious; and, in the opinion of those who have used them, fat cattle much quicker than either turnips or cabbages. Potatoes, too, being secured from the severities of winter, are a more certain article of fattening than turnips or cabbages; both of which are liable to perish under an alternacy of frost and thaw; and the turnip, more particularly, is locked up, or rendered more difficult to come at, during a continuance of snow or frost. Turnips and cabbages, if they out-weather the severities of winter, occupy the soil in the spring when it is wanted to be prepared for the succeeding crop; while potatoes, if properly laid up, are a food which may be continued without inconveniency until the cattle be finished, or the grass has acquired the requisite bite for finishing them in the field.

On the other hand, potatoes are a disagreeable crop to cultivate: the planting is a tedious dirty business; and taking them up, may be called the filthiest work of husbandry, especially in a wet autumn.

POTATOE, *Canada*. See *HELIANTHUS Tuberosus*.

POTATOES, *Spanish*, a name given to several species of the convolvulus, or bind-weed.

POTATOE Harrow, in *Agriculture*, an implement of the drag kind, made use of for harrowing out the potatoes after the plough. Mr. Young, as has been seen, used formerly to work the furrows after the plough by men with three-pronged forks, but that finding the method expensive, he contrived a diagonal harrow in a slim beam, with two or three teeth, to be drawn by one horse, managed by a man or boy, which tears the furrow to pieces, and lays the potatoes bare, and by repeating the operation clears the ground of the crop. It saved him from fourteen to twenty shillings *per* acre in labour. It is seen in the

plates on agriculture, under the head *Potatoe Harrow*, at *figs. 2* and *3*; in which the following are the dimensions in the first figure.

		ft.	in.	
From	1 to 2	5	8	
—	1 — 3	4	6	
—	4 — 5	2	6	
—	5 — 4	0	5	
—	4 — 6	0	5	
—	7 — 8	1	9	
Plate	- -	9	0	3 broad
Same	- -		0	0 $\frac{1}{2}$ thick
	From 10 to 11	0	5 $\frac{1}{2}$	
Breadth of iron plate		0	3	
In the curve		0	7	
Breadth of curved iron		0	3	
	From 12 to 13	straight line across.		

At *fig. 3*. is a side view of the harrow-part of the implement.

In working with this tool, the curved iron slides against the unploughed land, at the bottom of the open furrow, and thereby keeps the teeth diagonally placed, to avoid driving the earth in heaps in their work. In loose friable soils three teeth may be employed, but in stiffer ones only two. The tool performs its work well.

POTATOE Sets, the cuttings of the potatoe which are made use of as sets for planting. They should always have one or more eyes, and be from a quarter to half an ounce in weight, being cut from good sound roots. Small sets seldom succeed so well.

POTATOE Scoop, a sort of scoop made use of for taking out the eyes or buds of the potatoe for the purpose of sets; they are made of different sizes, according to the intention of the cultivator. Scoops of this sort are represented in the plate on agriculture, under the head *Potatoe Harrow*, at *figs. 4* and *5*. They are chiefly employed when potatoes are scarce.

POTATOE Bay, in *Geography*, a bay on the S. coast of the island of St. Christopher's.

POTCHENSKOI, a town of Russia, in the government of Archangel; 32 miles N.N.W. of Kola.

POTCHINKI, a town of Russia, in the government of Niznei Novgorod; 112 miles S. of Niznei Novgorod. N. lat. 54° 24'. E. long. 44° 14'.

POTEE, a town of Candahar; 25 miles E.N.E. of Candahar.

POTEMKIN, GREGORY ALEXANDROVITCH, in *Biography*, a favourite of Catharine II., who governed Russia with no less despotic authority than other ministers of that barbarous country, was descended from an ancient and noble family, established in the province of Smolensko. At an early age he entered the army, and soon became distinguished as an adherent to the empress. He served with applause under marshal Romanzoff, in the campaign against the Turks, and was deputed to deliver the keys of Bender to the empress, when it capitulated to the Russians in the year 1770. Before this period Potemkin affected a violent attachment to the empress; but Catharine paid little attention to mere marks of passion, and after having occupied a post at court about fifteen months, he received the usual order to absent himself; but he soon contrived to regain his political influence, though compelled to yield to a new favourite. From this period he maintained an ascendancy over the counsels of the empress, and introduced and dismissed successive favourites, according to his own caprice. He was perfectly well acquainted with the temper and disposition

disposition of the empress. In his correspondence with her he affected a great spirit of independence; returned the most laconic answers to letters written by her own hand; and governed her, it is said, no less by remonstrating against her weakness, than by indulging her passions. His honours, titles, and employments, now exceeded in number and distinction, those ever before possessed by any Russian subject. He was dignified by all the Russian orders of knighthood, and the principal orders of Prussia, Poland, and Sweden: he was field-marshal, and commander-in-chief of the Russian army; grand admiral of the Euxine and Caspian seas, and created a prince of the German empire. His revenues corresponded to his dignities: besides large estates, he received nine millions of rubles in money; he was lord over 40,000 peasants in Polish Russia, and 5000 in Russia; he had also a pension of seventy-five thousand rubles, and thirty thousand for his table. This income, extraordinary as it may appear, was found to be inadequate to his expences. During his campaigns, his march was constantly preceded by an English gardener, and several hundred labourers, who formed a garden on the spot where the tent of the prince was pitched, if he continued ever so short a space of time. He purchased enormous quantities of diamonds, with which he ornamented his dress; he lavished vast sums on his numerous mistresses; and expended still more on buildings, which he either never inhabited, or never used, but for the purpose of giving a magnificent entertainment or fête. To supply these expences, and gratify his passion for accumulating riches, he drew on the treasury for sums to an unlimited amount, and none of his drafts were ever rejected. He died at the close of the successful campaign against the Turks. He had been attacked at Yassy by an epidemic distemper, which he increased by every species of intemperance; and on his journey from Yassy to Nicolaief, he was seized with a violent fit of the colic, that carried him off. When the empress heard of his death, she was at first much affected with the news, but recovering from her first grief, she seemed pleased with her emancipation from his influence. Potemkin was clumsy in his person, but of herculean size and strength. In mixed companies he was silent and reserved; but among those with whom he was intimate, he was affable, cheerful, and indulged in mimicry and sarcastic raillery, in which he was thought to excel. He was attached to religious ceremonies, particularly to the pomp of the Greek church, and was well versed in ecclesiastical matters. In domestic life he was kind and liberal. He was voracious as well as capricious in his appetite. By nature and habit he was extremely indolent, and frequently neglected important business; but when roused to exertion his activity was as remarkable as his supineness. With all his faults and vices, he encouraged commerce and manufactures, was a great patron of learning, and promoted, as far as he was able, the study of Greek literature. He possessed a quick comprehension and a surprising memory; yet his knowledge of books was superficial. His reading was confined chiefly to the French, the belles lettres, and translations of the classics, and to Russian authors who had written on religious ceremonies; but the information which he drew from persons of eminence in every profession was prodigious. See Tooke's Translation of Caltera's Vie de Catharine II.

POTENDORF, in *Geography*, a town of Austria; 4 miles N.E. of Steyregg.

POTENGER, JOHN, in *Biography*, an English writer, was born at Winchester in 1647. He was educated at Corpus Christi college, Oxford, after which he entered himself of the Temple, and was called to the bar. He died at

Dorchester in 1733. He was author of a poem on Death, and translated the life of Agricola from Tacitus.

POTENT, or POTENCE, in *Heraldry*, a term for a kind of a cross, whose ends all terminate like the head of a crutch.

This is otherwise called the *Jerusalem cross*.

He beareth sable, a cross potent, or, by the name of *Aleyn*.

POTENT, *Counter-potent*. See COUNTER-potent.

POTENTIA, POTENZA, in *Ancient Geography*, a town of Italy, in Picenum, towards the S.E., at the mouth of a river of the same name, which became a Roman colony in the year 568.—Also, a town of Italy, in Lucania, S.W. of Opinum.

POTENTIA, *Power*, that whereby a thing is capable either of acting or being acted upon. See POWER.

POTENTIA, *To exist in*, is used among school-writers to denote that existence which a thing has in a cause capable of producing it, but which has not as yet actually produced it. In which it stands opposed to existence *in actu*.

POTENTIAL, POTENTIALIS, in the *Schools*, is used to denote and distinguish a kind of qualities, which are supposed to exist in the body *in potentia* only; by which they are capable, in some manner, of effecting and impressing on us the ideas of such qualities, though not actually inherent in themselves.

In this sense we say, potential heat, potential cold, &c. Brandy and pepper, though cold to the touch, are, as they say, potentially hot.

POTENTIAL *Cold* is a relative term, by which we mean, that such a thing is not actually cold to the touch, but in its effects and operations, if taken inwardly.

This quality is supposed, by those who have adopted the terms, to arise from the size, shape, &c. of the component particles of a body, which give some check or retardation to the blood's motion, whereby it is less agitated, and upon which the sensible parts of the body are not so briskly struck by it; the perception of which diminution or change of motion in the organs of feeling, is called *cold*.

Hence every thing that lessens the blood's motion, with relation to the sensation before made, is cold; and every thing which increases it, may be called potentially *hot*.

POTENTIAL, in *Medicine*, &c. Causteries are either actual, viz. a button of red-hot iron; or potential, as lime, and other caustic drugs.

POTENTIAL is also used by *Schoolmen*, for something that has the quality of a genus.

A potential whole is that which has its parts under it, as a genus has its species; to distinguish it from an *actual* whole, which has its parts in itself; as a body composed of matter and form.

Grotius, with a view to this distinction, uses the phrase, *potential parts of a state*, in opposition to the *subjective parts*.

By potential, he means those parts possessed of the sovereign power; by subjective, those subject to it; which are such with regard to the sovereign power, that several species are with regard to the genus of which they are the subjective parts.

Grotius maintains, that though the sovereign power be one and indivisible, yet it may have several potential parts: for as in the Roman empire there have been two potential heads, the one ruling in the East, the other in the West; yet the imperial authority, all the while, single and indivisible; so is it possible, the subjective parts combining to give away their sovereignty, may not give it entire, but reserve a part of it for certain emergencies. In which case the subjective

part becomes potential: and thus there are two potential parts, and yet the sovereignty single.

POTENTIAL, in *Grammar*, gives the denomination to one of the moods of verbs.

The potential mood is the same, in form, with the subjunctive; but differs from it in this, that it hath always implied in it, either *possim*, *volo*, or *debeo*; as *roget*, that is, *rogare potest*, the man may ask.

It is sometimes called the *permissive* mood, because it often implies a permission or concession to do a thing; as *habeat*, *valeat*, *vivat*, *cum illa*. Terent.

POTENTILLA, in *Botany*, so called, as it is said, from *potentia*, power, in allusion to its reputed virtues; but these are truly of a diminutive kind, like the name.—Linn. Gen. 255. Schreb. 342. Willd. Sp. Pl. v. 2. 1094. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 547. Ait. Hort. Kew. v. 3. 273. Juss. 338. Lamarck Illustr. t. 442. (Pentaphyllum; Gært. t. 73.)—Class and order, *Icosandria Polygynia*. Nat. Ord. *Senecioideæ*, Linn. *Rosaceæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, nearly flat, divided half way down into ten segments; the alternate ones smaller and reflexed. *Cor.* Petals five, roundish, or inversely heart-shaped, spreading, attached by their claws to the calyx. *Stam.* Filaments twenty, awl-shaped, shorter than the corolla, inserted into the calyx; anthers elongated into the form of a crescent. *Pist.* Germens numerous, minute, collected into a head; styles thread-shaped, the length of the stamens, inserted laterally into the germens; stigmas obtuse. *Peric.* none. *Common receptacle* of the seeds roundish, dry, minute, permanent, covered with the seeds, and enclosed in the calyx. *Seeds* numerous, ovate, rather compressed, pointed, generally transversely corrugated.

Ess. Ch. Calyx in ten segments, inferior. Petals five. Seeds roundish, naked, transversely corrugated, affixed to a small dry receptacle.

The species of this pretty genus are all, except the first, herbaceous, and for the most part perennial. Their flowers are generally yellow, sometimes white, very rarely with a tinge of pink. The leaves are compound, and mostly cut or serrated; more or less sparingly hairy, or silky. Inflorescence axillary or terminal, simple or forked. Linnæus describes twenty-seven species in his Sp. Pl. Willdenow has forty-one. They are natives of cold or temperate climates, and rather mountainous situations. The genus is divided into three sections.

Section 1. *Leaves pinnate*. Thirteen species, three of them British.

P. fruticosa. Shrubby Cinquefoil. Linn. Sp. Pl. 709. Willd. n. 1. Ait. n. 1. Fl. Brit. n. 1. Engl. Bot. t. 88.—Leaves pinnate. Stem shrubby.—Native of mountainous bushy places in the north of Europe, but rarely. It has been found in Siberia, the south part of the Swedish isle of Oeland, and about the river Tees, in Yorkshire. In our gardens and shrubberies it is frequent, forming a bushy shrub, three or four feet high, covered throughout the summer with solitary terminal flowers of a golden yellow, the calyx of which has five of its segments remarkably large and leafy. The leaves of the plant are alternate, stalked, composed of five, rarely seven, oblong entire leaflets. *Stipulas* solitary, oblong, membranous, placed within each footstalk, and united to its base.

P. anserina. Silver-weed, or Wild Tansey. Linn. Sp. Pl. 710. Willd. n. 2. Ait. n. 2. Fl. Brit. n. 2. Engl. Bot. t. 861. Curt. Lond. fasc. 3. t. 31. Fl. Dan. t. 544. (Argentina; Ger. Em. 993.)—Leaves interruptedly pinnate, serrated, silky beneath. Stem creeping. Stalks axillary, single-flowered.—Native of pastures, osier-holts, and

low commons, in England, and other parts of Europe, flowering through the summer. It prefers a clay soil, though it often grows in peat earth. Linnæus says this species always indicates the presence of clay under the surface. His translators have by mistake referred this remark to *P. argentea* hereafter described, see Rose's Botany, 382; and indeed Linnæus himself is partly responsible for this error, which has crept into Engl. Bot. at p. 89. *P. anserina* is a very handsome plant, conspicuous for its ample silvery foliage, and large golden flowers.

P. rupestris. Strawberry-flowered Cinquefoil. Linn. Sp. Pl. 711. Willd. n. 8. Ait. n. 6. Fl. Brit. n. 3. Engl. Bot. t. 2058. Jacq. Austr. t. 114. (Pentaphyllum fragiferum; Ger. Em. 991.)—Leaves pinnate, lyrate, of seven, five, or three, ovate, serrated, hairy leaflets. Stem erect.—Found in shady alpine spots, in Sweden, Siberia, Germany, Switzerland, and, according to Ray, on the sides of Craig Wreidhin, Montgomeryshire; but we have never seen a wild British specimen. In gardens it is a hardy perennial, of easy culture, flowering copiously in the early part of summer. The stems are about a foot high, branched. Leaflets obtuse, hairy, not hoary. Flowers remarkably like the hautbois strawberry, copious, somewhat panicled. The seeds too are smooth, as in *Fragaria*, not rugged.

P. pensylvanica. Pennsylvanian Cinquefoil. Linn. Mant. 76. Willd. n. 12. Ait. n. 9. Jacq. Hort. Vind. v. 2. 89. t. 189. Figured also in Gmel. Sib. v. 3. t. 34. f. 1.—Leaves pinnate, with deeply toothed decurrent leaflets; the uppermost only ternate. Stem erect, downy.—Native of North America, as well as of Siberia. Miller cultivated it at Chelsea, and Jacquin at Vienna; but this is one of those ordinary looking plants, which, unless they can take care of themselves, seldom remain long in any garden. The stem is a foot or two high. Leaves deeply cut, of a hoary green. Flowers small, yellow, not ornamental, disposed in a kind of downy panicle.

P. supina. Trailing Cinquefoil. Linn. Sp. Pl. 771. Willd. n. 13. Ait. n. 10. Jacq. Austr. t. 406. (Pentaphyllum supinum, potentillæ facie; Ger. Em. 988.)—Leaves pinnate, deeply toothed. Stem prostrate. Flowers axillary, solitary.—Native of Siberia and Germany; cultivated in England before 1696, but it has as few attractions as the last, from which it differs in having a prostrate stem and perfected flowers. The root is tapering, singular in this section for being annual.

Section 2. *Leaves digitate*. Twenty-one species, six British.

P. recta. Upright Cinquefoil. Linn. Sp. Pl. 711. Willd. n. 14. Ait. n. 11. Jacq. Austr. t. 383. (Quinquefolium majus rectum; Ger. Em. 987.)—Leaflets five to seven, obovato-lanceolate, coarsely toothed. Petals inversely heart-shaped, larger than the calyx. Stem erect, corymbose, forked, many-flowered.—Native of Italy, France, Switzerland, and Germany, in stony dry places, flowering copiously in summer. It has long been cultivated in botanic gardens, and sometimes finds a place in flower borders, being recommended by its copious yellow blossoms, which often assume a pale sulphur-like hue. The plant is a hardy perennial, very hairy, and grows in a corymbose manner, to the height of two feet.

P. argentea. Hoary Cinquefoil. Linn. Sp. Pl. 712. Willd. n. 17. Ait. n. 12. Fl. Brit. n. 4. Engl. Bot. t. 89. Fl. Dan. t. 867. (Quinquefolium tormentillæ facie; Ger. Em. 988.)—Leaflets five, wedge-shaped, cut; downy beneath. Stems ascending.—Native of open, dry, gravelly pastures in Europe: not rare in England, flowering in June. This is much smaller, and less upright, than the last-

POTENTILLA.

last-mentioned, distinguished by the snow-white cottony hoariness of the *stalks* and backs of the *leaves*, to which the name *argentea* does not well apply. Indeed we are persuaded that Linnæus, in his recollection at least, confounded this with the *anserina*, a species very widely different in all but whiteness; and that is cottony in the present, silvery in the *anserina*. The *flowers* of the *argentea*, though small, are conspicuous for their golden colour.

P. opaca. Saw-leaved Hairy Cinquefoil. Linn. Sp. Pl. 713. Willd. n. 23. Ait. n. 16. Engl. Bot. t. 2449. Jacq. Ic. Rar. t. 91. (*Pentaphyllum incanum*, minus, repens; Ger. Em. 989.)—Radical leaves of seven hairy, linear-wedge-shaped, deeply serrated leaflets; stem-leaves mostly opposite, of three items, slender, decumbent.—Native of Germany and Switzerland; found, since the publication of Fl. Brit., on the mountains of Scotland, flowering in June. The *opaca* of Hudson was only *verna*. The present bears many spreading, partly decumbent, *stems* from the crown of the perennial *root*, which compose a lax tuft, a foot wide, or more, green and hairy. The radical *leaves* grow on long *stalks*; the rest are nearly sessile, and mostly opposite; leaflets so deeply serrated as to be almost pinnatifid. *Flowers* handsome, of an orange yellow, on long, hairy, lateral *stalks*.

P. verna. Spring Cinquefoil. Linn. Sp. Pl. 712. Willd. n. 24. Ait. n. 17. Fl. Brit. n. 6. Engl. Bot. t. 37. (*Fragaria verna*; Crantz Austr. fasc. 2. 12. t. 1. f. 1.)—Radical leaves of five wedge-shaped, serrated, furrowed, fringed, rather coriaceous leaflets; stem-leaves of three. Stem reclining.—Found in dry pastures of the north of Europe, where the ground is barren, and chalky or gravelly; flowering with us in April or May. Its growth is humble, and texture more coriaceous than the last. The *leaflets* are nearly obovate. *Flowers* about the ends of the *stems*, on longish *stalks*; their *petals* yellow, scarcely so long as the *calyx*.

P. aurea. Golden Cinquefoil. Linn. Sp. Pl. 712. Willd. n. 25. Ait. n. 18. Fl. Brit. n. 5. Engl. Bot. t. 561. Fl. Dan. t. 114. (*Quinquefolium minus*, flore aureo; Ger. Em. 990.)—Radical leaves of five obovate, deeply serrated, hairy, somewhat membranous leaflets; stem-leaves of three. Stem nearly erect.—Native of the mountains of Norway, Germany, Switzerland, Italy, &c. as well as of the Scottish alps, flowering in July. This is larger, more erect, and far more handsome than the last, with more conspicuous golden *flowers*, and less coriaceous *leaves*. The segments of the *calyx* are all nearly equal in length, though not in breadth.

P. alba. White Cinquefoil. Linn. Sp. Pl. 713. Willd. n. 28. Ait. n. 20. Fl. Brit. n. 7. Engl. Bot. t. 1384. Jacq. Austr. t. 115. (*Quinquefolium sylvaticum majus* flore albo; Ger. Em. 989.)—Leaflets five; silky beneath; with converging serratures at the summit. Stems thread-shaped, procumbent. Receptacles very hairy.—Native of the alps of Germany and Hungary, in shady places. Hudson records it as a Welsh plant, on the authority of a Mr. Haviland; but his assertion has never been confirmed. This *Potentilla* is a favourite decoration for rock-work in most gardens, flowering from May to August. The glaucous silvery *leaves*, and abundant snowy *blossoms*, each on long slender *stalks*, are elegant and uncommon. The *receptacle* is remarkable for long dense hairs. *Seeds* slightly corrugated.

P. nitida. Peach-blossom Cinquefoil. Linn. Sp. Pl. 714. Willd. n. 32. Ait. n. 23. Jacq. Austr. append. t. 25.—Leaflets five or three, downy, with three converging teeth. Stems single-flowered. Receptacles woolly.—Native of Austria, as well as of mount Baldus, and of the

Tyrol. Sir Joseph Banks procured it for Kew garden in 1798, and it flowers there in the middle of summer. Nothing can be more elegant than the silvery *leaves* and pink *flowers*; which last are well compared by Pona, Bauhin, and Ray to the blossoms of a peach. This humble plant forms dense tufts, from one to two inches only in height, though the *flowers* are nearly an inch wide.

P. reptans. Common Creeping Cinquefoil. Linn. Sp. Pl. 714. Willd. n. 34. Ait. n. 24. Fl. Brit. n. 8. Engl. Bot. t. 862. Curt. Lond. fasc. 1. t. 37. Woodv. Med. Bot. t. 59. (*Quinquefolium vulgare*; Ger. Em. 987.)—Leaflets five, obovate, serrated. Stem creeping. *Stalks* single-flowered.—Native of open places, on a clay soil, as well as in waste ground by way-sides, in England and other parts of Europe, flowering from June to August. The long, trailing, creeping *stems*, the upright, deep-green rather hairy leaves, and large yellow *flowers*, whose *stalks* are taller than the foliage, readily distinguish this common species.

Section 3. *Leaves ternate*. Seven species, one of them British.

P. nivea. White-leaved Cinquefoil. Linn. Sp. Pl. 715. Willd. n. 37. Fl. Dan. t. 1035.—Leaflets three, cut, downy beneath. Stem ascending.—Native of the alps of Norway, Lapland, and Siberia; a stranger to our gardens. The structure of the herbage, as Linnæus observes, resembles *P. verna*, but the *leaflets* are only three, broader and much more hairy than in that species, very downy and white beneath. *Petals* yellow.

P. speciosa. Silvery Cretan Cinquefoil. Willd. n. 38. Sm. Prodr. Fl. Græc. Sibth. v. 1. 352. Fl. Græc. t. 484. unpublished.—(*Fragaria cretica saxatilis fruticosa*, folio subtus argenteo; Tourn. Cor. 21.)—Leaflets three, elliptical, obtuse, toothed, downy beneath. Stem shrubby.—Native of the hills of Crete, as well as of mount Parnassus. *Sibth.* The *stems* are a span high, rigid, and rather woody, with a deciduous bark. *Leaves* resembling the wild strawberry, but snow-white at the back. *Flowers* on very downy corymbose terminal *stalks*, accompanied by one or two simple *leaves*. *Calyx* woolly. *Petals* white.

P. tridentata. Trifid-leaved Cinquefoil. Soland. in Ait. Hort. Kew. ed. 1. v. 2. 216. t. 9. ed. 2. v. 3. 279. Willd. n. 39. Sm. Tr. of Linn. Soc. v. 10. 343. Engl. Bot. t. 2386.—Leaflets three, wedge-shaped; smooth above; hairy beneath; three-toothed at the summit.—Native of Newfoundland; and discovered by the late Mr. Geo. Don, on a mountain called Werron, in Angushire. It has, for nearly 30 years, been cultivated in our more curious gardens, and flowers early in summer. The *stems* are erect, three or four inches high, herbaceous, though the *root* is woody. *Leaves* several, stalked, dark green and smooth above; pale and rather hairy beneath. *Flowers* few, terminal, pure white with purple *anthers*.

P. grandiflora. Great-flowered Cinquefoil. Linn. Sp. Pl. 715. Willd. n. 40. Ait. n. 28. Curt. Mag. t. 75. (*Fragaria*; Hall. Hist. n. 1114. t. 21.)—Leaflets three, toothed, somewhat hairy on both sides. Stem reclining, longer than the leaves.—Native of Siberia, Switzerland, Italy, and the Pyrenean mountains, long cultivated in the gardens of Britain, where it decorates rock-work, flowering in June and July. The aspect of the *flowers* and *herbage* is not very unlike our common *P. reptans*, but the *stems* do not creep, and the *leaflets* are only three. In a wild state, the plant has a more elegant appearance and brighter colours.

POTENTILLA, in *Gardening*, contains plants of the herbaceous and shrubby kinds, of which the species cultivated are, the shrubby cinquefoil (*P. fruticosa*); the strawberry

berry cinquefoil (*P. fragarioides*); the upright cinquefoil (*P. recta*); the Montpellier cinquefoil (*P. montpelienfis*); and the great-flowered cinquefoil (*P. grandiflora*).

Besides these, other species may be cultivated for variety.

Method of Culture.—The first sort may be readily increased by suckers, layers, and cuttings, which may be laid down or planted out in the autumn or spring season, and be removed into the nursery in the spring following; and after having two or three years growth in that situation, they will be fit for planting out in the clumps or shrubby borders.

When removed from their natural situations into these places, the best season is in the autumn, before the frosts begin, that they may get well rooted. They should be watered occasionally in dry weather.

They succeed best in a cool moist soil and shady situation.

All the other kinds may be increased by parting the roots, and planting them out in the autumn, or by sowing the seeds either in the autumn or spring seasons.

They all afford ornament and variety in the different parts of pleasure-grounds.

POTENZA, PASQUALE, in *Biography*, an opera singer, with a feeble and uncertain soprano voice, and an affected actor, not without vocal taste, supplied the place of Ricciarelli as first man in our serious opera, when the Mattei was first woman, from 1757 to 1759.

POTENZA, in *Geography*, a town of Naples, in Basilicata, the see of a bishop, suffragan of Matera; built on the ruins of an ancient town, which was destroyed in the year 1250; 54 miles S.E. of Benevento. N. lat. 40° 40'. E. long. 14° 4'.—Also, a river which rises in the marquisate of Ancona, and runs into the Adriatic, N. lat. 43° 22'. E. long. 13° 45'.

POTERII ANTIHECTICUM. See ANTIHECTICUM.

POTERIUM, in *Botany*, an ancient name, adopted by the Latins from the Greeks, whose *ποτήριον*, at least that of Dioscorides, evidently appears to have been a species of *Astragalus*, confounded by Linnæus with *A. Tragacantha*, but distinguished by Lamarck under the denomination of *creticus*; see Sm. Prodr. Fl. Græc. Sibth. v. 2. 91. Perhaps Linnæus, in the choice of the name in question for the genus of which we are about to treat, had in view *ποτήριον*, a cup; the herb being, in some countries, infused, along with borage, in cooling potations.—Linn. Gen. 495. Schreb. 645. Willd. Sp. Pl. v. 4. 421. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 1024. Ait. Hort. Kew. v. 5. 286. Juss. 336. Lamarck Illustr. t. 777. (Pimpinella; Tourn. t. 68. Gært. t. 32.)—Class and order, *Monocœcia Polyandria*. Nat. Ord. *Miscellanea*, Linn. *Rosacea*, Juss. Gen. Ch. Male, *Cal.* Perianth of three or four ovate, coloured, deciduous leaves. *Cor.* of one petal; tube cylindrical, about the length of the calyx; limb in four deep, ovate, concave, spreading, permanent segments. *Stam.* Filaments numerous, from thirty to fifty, capillary, very long, flaccid; anthers roundish, of two lobes.

Female, in the upper part of the same spike. *Cal.* Perianth inferior, resembling the male. *Cor.* of one petal, wheel-shaped; tube short, roundish, contracted at the mouth; limb in four deep, ovate, flat, reflexed, permanent segments. *Pist.* Germens one or two, ovate-oblong, within the tube of the corolla; styles one or two, capillary, coloured, flaccid, the length of the corolla; stigmas tufted, coloured. *Peric.* Drupa formed of the thickened, hardened, closed tube of the corolla. *Seed.* Nut of two cells.

Eff. Ch. Male, Calyx of three or four leaves. Corolla deeply four-cleft. Stamens thirty to fifty.

Female, Calyx of three or four leaves. Corolla deeply

four-cleft. Pistils one or two. Nut of two cells, invested with the hardened tube of the corolla.

Linnæus describes three species of *Poterium*, to which Willdenow adds three more. The most remarkable are

P. Sanguisorba. Common Burnet. Linn. Sp. Pl. 1414. Willd. n. 1. Ait. n. 1. Engl. Bot. t. 860. Curt. Lond. fasc. 2. t. 64. Mart. Rust. t. 69. (*Pimpinella hortensis*; Ger. Em. 1045.)—Spines none. Stem herbaceous, somewhat angular.—Native of exposed limestone or chalky situations, in the more temperate parts of Europe; plentiful on the chalk hills of England, flowering in July. The root is woody and perennial. Stems branched, leafy, more or less angular, many-flowered, smooth, often reddish. Leaves pinnate; of several pairs of roundish or elliptical, serrated, smooth, rather glaucous leaflets, with a terminal one about the same size. Heads of flowers stalked, terminal, solitary. Calyx and corolla greenish. Stamens like a tassel of purple silk. Fruit rugose. Some of the male flowers have occasionally an abortive pistil. The leaves possess a flavour like cucumber, which they communicate to any liquor in which they are infused. They are also an ingredient in fallads.

Willdenow's *P. polygamum*, adopted from Waldstein and Kitaibel's *Plantæ Hungaricæ*, v. 2. 217. t. 198, seems a very trifling variety, some of the intermediate flowers of whose spikes, or heads, have both stamens and pistils.

P. spinosum. Prickly Shrubby Burnet. Linn. Sp. Pl. 1412. Willd. n. 6. Ait. n. 5. (*P. Dalechampii*; Clus. Hist. v. 1. 108.)—Stem shrubby, with branched spines. Branches villous, somewhat angular. Spikes oblong, lax.—Native of the Levant. A bushy prickly shrub, with abundance of small, round, pinnate leaves, and oblong purplish spikes.

POTERIUM, in *Gardening*, contains plants of the herbaceous and shrubby perennial kinds, of which the species cultivated are, the lesser upland, or common garden burnet (*P. sanguisorba*); the sweet burnet (*P. hybridum*); and the prickly shrubby burnet (*P. spinosum*).

Method of Culture. The first sort may be readily increased by seeds and parting the roots.

The seeds should be sown in the autumn, on a bed or border of light mould, when they are perfectly ripened. When the plants have attained two or three inches in height, they should be planted out on a bed, at the distance of a foot, when for salads, or in the borders where they are to remain.

The roots may likewise be parted in autumn, and planted where they are to remain, in the same manner as above.

The second sort may be increased in the same way. And the last sort may be raised from slips or cuttings, which should be planted in a bed of light earth during the summer season, and covered with glasses or in pots, and placed under a frame and glasses, giving shade and water occasionally.

They may also be had more forward by plunging the pots in a moderate hot-bed under glasses. They should be removed into separate pots when they have stricken good root, and are well established. They should afterwards be protected from frosts in the winter, by being placed in a mild hot-bed, and have but little water in the winter season.

The first sorts are ornamental in the borders, clumps, and other parts; and the last, among other potted green-house plants.

POTERIUM is also used by many for the prickly pimpinella. See Burnet, SAXIFRAGE.

POTES, in *Geography*, a town of Spain, in Asturia; 25 miles S.W. of Santillana.

POT-HERBS, in *Gardening*, such as are used for different culinary purposes, consisting of different sorts of the small

small aromatic kind, and some others. But in a more general signification, they comprehend many of the other kitchen garden vegetables, but are principally understood to be such as are in request to improve soups, broths, and some other similar culinary preparations, in which, sometimes, several different kinds of small herbs are used in different proportion, both in composition and singly.

They are chiefly the following sorts: thyme, marjoram, favory, sage, parsley, mint, penny-royal, sorrel, chervil, basil, coriander, dill, fennel, marigold, borage, burnet, tansy, tarragon, chives, leeks, onions, green beet, white beet, spinach, celery, endive, lettuce, love-apple, capsicum, and purslane.

Those made use of separately, as fallad-herbs, are green and white beet, to-boil as separate dishes; celery, endive, and lettuce, as choice fallad-herbs, and sometimes to stew. But of the above, the thyme, marjoram, favory, parsley, sage, mint, marigold, penny-royal, leeks, celery, and onions, are in the greatest request.

Proper supplies of the different sorts may be raised in the manner directed under their particular heads. See AROMATIC and KITCHEN GARDEN Plants.

POTHERIE, LA, in *Geography*. See CHALAIN.

POTHERY, in *Rural Economy*, a provincial word signifying close, muggy, or sultry, in speaking of the weather.

POTHIER, ROBERT-JOSEPH, in *Biography*, a considerable French writer on legal subjects, was born at Orleans in the year 1699; of the university of which city he became professor of the law. He, at first, directed his studies to Roman jurisprudence, and for the elucidation of which he held weekly meetings of the learned on the subject at his own house. He next applied himself to the French law, and was, without any solicitation on his part, appointed professor by the chancellor d'Aguesseau; and in order to excite the emulation of students, he established prizes for proofs of great proficiency. He died in 1772, with a character not less respectable for morals than for learning and industry. His works on French and Roman law were numerous. Among the principal are "Pandectæ Justinianæ," 3 vols. folio, 1748; "Traité des Fief," 2 vols. 1776; Posthumous Works, in 3 vols. 4to.

POTHOLT, JACOB, organist and carillonneur in 1772, in the old kirk at Amsterdam. He was blind, having been deprived of his sight at seven years old by the small-pox; and this misfortune suggested to his friends the idea of making music, which had hitherto given him pleasure, his profession; but it afterwards became his darling amusement.

The organ at the old kirk is what organ builders call a 16 feet instrument, from the length of the lowest pipe in the open diapason, or Bordoun stop. This instrument is very full of work, and has 64 stops, three sets of keys, both in the manuals and pedals, with nine pair of bellows.

Potholt was organist of the Wester Kirk 22 years before he obtained this place; his hand, taste, and abilities in every particular, were truly astonishing; the touch of this instrument was the heaviest that we ever felt; each key requiring almost a two-pound weight to put it down; and to play it full, there was a spring of communication, by which the keys of the great and choir organ were moved at the same time, which likewise added very much to the stiffness of the touch; however, such was the force of M. Potholt's hand, that he played this organ with as much lightness and rapidity, as if it were a common harpsichord.

This admirable organist was never out of Amsterdam, except for a few days at the Hague, many years ago; and yet his taste was of the best modern kind; his appoggiaturas were well taken, and admirably expressed; his fancy was extremely

lively; and though he played very full, seldom in less than five parts, with the manuals and pedals together, yet it was neither in the dry nor crude way, which we had so frequently heard in Germany. He discovered, though not injudiciously, by many of his passages, that he was a harpsichord player; but so well was he acquainted with the different genius of the organ, that his most rapid flights, of which he had many, occasioned none of those unpleasing vacuities of sound, which so commonly happened, when this instrument was touched by mere harpsichord players.

M. Potholt played two fugues in a very masterly manner, the subjects of which he reversed, and turned to a thousand ingenious purposes.

He published, in 1777, a work for young organists, with the following Dutch title: "Musyk (de) van de CL Psalmen mit Interluden in Bassen doer," Jacob Potholt, Amsterdam, 4to.; the CL psalms harmonized, with interludes.

POTHOS, in *Botany*, *πῶθος*, an old Greek name for some plant unknown to us, and which signifies *desire* or *love*. Some have applied it to the Columbine, *Aquilegia*. Perhaps Linnæus adopted it in the bad sense of certain ancient writers, as meaning *noxious*, or *offensive*, because of the intolerable fœtor of some species, and the acrimony of others.—Linn. Gen. 472. Schreb. 85. Willd. Sp. Pl. v. 1. 684. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 268. Juss. 24. Lamarck Illustr. t. 738.—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Piperitæ*, Linn. *Aroideæ*, Juss.

Gen. Ch. *Cal.* Sheath globose, of one leaf, bursting at one side, enclosing a simple, oblong, thick *receptacle*, entirely covered with sessile flowers. *Perianth* none, unless the corolla be taken for such. *Cor.* Petals four, wedge-shaped, oblong, erect. *Stam.* Filaments four, flattish, erect, narrower than the petals, but of the same length; anthers minute, in pairs. *Pist.* Germen superior, oblong, angular, abrupt; style none; stigma simple. *Per.* Berry roundish, of two cells. *Seeds* roundish, solitary in each cell.

Ess. Ch. Sheath of one leaf. *Receptacle* oblong, covered with flowers. *Perianth* none. Petals four. Berry with two seeds.

The plants of this genus are mostly of tropical origin, with the habit of *Arum*, perennial, smooth, often coriaceous in texture. Linnæus enumerates but six of them in his Sp. Pl. but Willdenow has twelve. The Hortus Kewensis contains ten. The following will serve as examples.

P. cannaefolia. Sweet-scented Pothos. Sims in Curt. Mag. t. 603. Ait. n. 4.—Leaves elliptical, with simple parallel veins.—Native of the West Indies; sent to Kew in 1789, by Mr. Alex. Anderson, under the name of *P. odorata*, alluding to the sweet scent of its flowers, unusual in this tribe. It blooms in the stove in April and May. The leaves are radical, pointed, much resembling those of *Canna indica*. Flowers whitish, as well as the inner surface of their sheath. The latter, like the *receptacle*, is three or four inches long.

P. macrophylla. Large-leaved Pothos. Swartz Ind. Occ. 269. Willd. n. 8. Ait. n. 7. (*P. grandifolia*; Jacq. Ic. Rar. t. 610.)—Leaves heart-shaped, with divaricated lobes. *Receptacle* much longer than the sheath.—Native of the West Indies. Flowering in our stoves in June. This, like the foregoing, is destitute of a stem. The leaves are about two feet long, ribbed and veiny. *Receptacle* above a foot long, covered with brown flowers, and subtended by a green recurved sheath.

P. digitata. Fingered Pothos. Jacq. Coll. v. 4. 119. Ic. Rar. t. 611. Willd. n. 11.—Leaves digitate; of about nine oblong sharpish leaflets.—Native of the warmest parts of South America. This has a thick climbing stem, throw-

ing out long thick radicles. *Leaflets* a span long, obovate, pointed, on short partial footstalks. *Flowers* axillary, solitary, whitish, with a small red *sheath*.

P. fatida. Stinking Pothos, or Scunkweed. Ait. n. 9. Sims in Curt. Mag. t. 836. (*Dracontium fœtidum*; Linn. Sp. Pl. 1372. Willd. Sp. Pl. v. 2. 288.)—Leaves heart-shaped, acute. Sheath nearly globose, inflated, with an incurved point.—Native of North America, a hardy perennial with us, flowering in March and April, before the leaves appear. The *flowers* exhale a very fœtid odour, and are sessile, close to the ground, consisting each of a globular *receptacle*, covered with white *petals* and yellow anthers, and enveloped in a large, ovate, concave *sheath*, variegated with dull purple and a dirty yellow. The *leaves* are of a fine green.

POTI, in *Geography*. See PUTI.

POTICARA, in *Ancient Geography*, a town of Asia, in the interior of the Perside, between Cotamba and Ardea, according to Ptolemy.

POTIDŒA, a town of Macedonia, and one of the five places which Scylax, in his Periplus, has assigned to the peninsula of Palléné. According to Thucydides, it was situated on the isthmus which joined the peninsula to Macedonia. Livy says that this town had been built, or as he should have said, repaired, by king Cassander, from which circumstance it took the name of Cassandria.

POTIERS, in *Geography*, a town of France, in the department of the Coté d'Or; three miles from Molefmes.

POTIGNY, a town of France, in the department of the Calvados; 5 miles N. of Falaise.

POTIJI, a river of Brazil, which runs into the sea, S. lat. 5° 43'.

POTINCOBA, in *Botany*, a name by which some authors call water-pepper, or the sharp arsmart.

POTION, PORIO, a liquid medicine, in the quantity of a draught, or so much as is to be taken at one time.

A potion only differs from a julep, or a mixture, in the quantity, as being confined to one dose.

There are purging potions, emetic potions, diaphoretic, pectoral, cephalic, cardiac, stomachic, hysterical, vulnerary, carminative, &c. potions.

POTIRONE, in *Botany*, a name given by the people of Burgundy to a stinking kind of fungus, found about the roots of trees. They have also extended the name much farther, and use it for a sort of touchwood, or rotten wood of the oak, and other trees common in the forests of those countries, which shines in the night, and has the same smell with that fungus.

POTITII, in *Antiquity*. See PINARII.

POT-METAL is formed of lead mixed with copper, in the proportion of one part of lead to four of copper. This metal is harder than copper, or even brass.

POTNIÆ, in *Ancient Geography*, a town of Bœotia, N.E. of Platæa, and S.W. of Thebes. It was ruined in the time of Pausanias. Here still remains a grove, consecrated to Ceres and Proserpine; and in this grove are some statues denominated "Potniades." Although the town is destroyed, the site of it is still held in veneration, and at a certain time of the year, sacrifices are offered to Ceres and Proserpine. Near this sacred grove is a temple of Bacchus, surnamed "Egobolus."

POTOKA, in *Geography*, a river of America, which runs into the Wabash, N. lat. 38° 18'. W. long. 88° 28'.

POTOSI, a celebrated city of the viceroyalty of La Plata, or Buenos Ayres, and next in importance, if not superior, to Buenos Ayres, the capital. It is situated in a district, inclosed by the province of Porco,

which is mountainous and cold, and consequently very barren; the valleys are entirely destitute of wood, and nothing grows on the shelves and declivities of the mountains but moss. The summits of the mountains are covered with perpetual snow, nevertheless it affords a scanty supply of sheep, and some vicunas; and in this desolate country nature has placed some of the richest mines of silver in the world. The district of Potosi is bathed by the river Pilcomayo, which joins the Parana not far above Corrientes, so that there is a natural connection between this province and Buenos Ayres. The mine of Potosi was discovered in 1545, and the city, which stands on the S. side of a mountain of the same name, in a glen formed by a rivulet, was founded in the year 1547. The mint was established in 1562, and has continued richly to supply all Europe with silver. By a census of its inhabitants, made in 1611, its population is said to have amounted at that time to 160,000 souls. If this account, extracted from the "Mercurio Peruviano," be correct, Potosi must have greatly declined from its ancient state, though Helms, a late writer, ascribes to it a population of 100,000. Dr. Robertson, from the best Spanish authorities, assigned to it 25,000, and the same number is given by Alcedo. According to the report of the "Mercurio Per." its whole population in 1792 consisted of only 18,181 souls; of whom 256 were ecclesiastics and persons under vows; 3482 Spaniards; 4872 Mestizoes; 8559 Indians; 1012 Negroes and Mulattoes. The wealth of Potosi produced the establishment of numerous convents, a vow of poverty not at all interfering with great riches. Within the city and district there were 14 curates; but in the year 1759, seven curacies were abolished. In the neighbourhood of the city there are warm medicinal baths, called those of Don Diego, and highly esteemed. As soon as the mines of Potosi were discovered, and the town was established, it became a place of great resort; and in process of time it reckoned among its inhabitants many noble families, particularly those concerned in the mines; and it is estimated to be about two leagues in circumference. By the Spanish writers it is styled an imperial city; it is the residence of a corregidor, and of a tribunal of finance, composed of a comptroller and treasurer. Its commerce was formerly compared with that of Lima, and in time became superior to it, consisting in the exchange of ingots of silver for the articles imported; but it is now said to be upon the decline. A cold and violent wind, called "tomahavi," prevails during the months of May, June, July and August. Although the air of the mountain, on the declivity of which it is situated, being cold and dry, renders the adjacent country remarkably barren, so that it produces neither grain, fruits, herbs, nor other esculents, the town is so plentifully provided, as to enjoy abundance of every kind; and the trade for provisions is greater here than in any other place, Lima alone excepted. This may be naturally ascribed to the attraction of a mountain of silver, and to the number of people employed in the mines. Some provinces send the best of their grain and fruits; others their cattle; others their manufactures; and those who trade in European goods resort to Potosi, as to a market where is a great demand, and no want of silver to give in exchange.

The celebrated *mines* of Potosi were discovered, as we have said, in 1545, by an accident seemingly fortuitous. An Indian, called by some Gualca and by others Hualpa, pursuing some wild goats to the mountain of Potosi, and arriving at a very steep part, laid hold of a small shrub in order to ascend with the greater security and speed, but the shrub, unable to support his weight, was torn up by the roots, and discovered a mass of fine silver; and at the same time he

found

POTOSI.

found some lumps of the same metal among the clods which adhered to the roots. This Indian, who lived at Porco, not far distant, hastened home with the fruits of his discovery, washed the silver and used it, repairing, when his stock was nearly exhausted, to his perpetual fund. At length an intimate friend, named Guanca, observing the happy change that had taken place in his circumstances, became solicitous to investigate the cause, which Guanca disclosed to his friend. For some time they retired in concert to the mountain for fresh supplies of silver, till Guanca refusing to discover his method of purifying the metal, Guanca revealed the whole secret to his master, Villaroel, a Spaniard who resided at Porco. Immediately on this information he went, on the 21st of April 1545, to view this fortunate breach in the mountain, and the mine was worked without delay and with immense advantage. This mountain, which had been assiduously worked from its first discovery, and which is said to produce weekly about 5000 marks of silver, that is from 30 to 40,000 dollars, is of a conic form, about 20 British miles in circumference, and perforated by more than 300 rude shafts, through a fine yellow argillaceous schistus. Here are veins of ferruginous quartz, interspersed with what are called the horn and vitreous ores, of a peculiar dark-reddish colour. This mountain rises void of all vegetation, blasted by the numerous furnaces, which in the night form a grand spectacle. These mines are distant 1873 English miles from Buenos Ayres: and the greatest part of the journey to them lies through a barren uncultivated country, and the last 400 miles of it are across mountains very difficult to pass, the bed of a torrent being in many places the only road. To an enemy, therefore, it must be a very hazardous enterprise to penetrate from Buenos Ayres to Potosi, and quite impossible, if any resistance be opposed to it. The true road to Potosi is not through Buenos Ayres, but by Peru; not through the country to which it has been artificially annexed, but through that on which it depends for its subsistence. The benefit of the mines is open to all who chuse to avail themselves of it; but labourers are not easily procured. On account of the small population, scarcely one quarter can be found of the necessary number, Indians being always employed; and in this view no mine is so useful as that of Potosi; for every 18 months there are sent from the provinces of the viceroyalty 6000 Indians, enrolled and divided into parties, in order to work in the mines. This expedition of Indians is called "Mita;" and they are distributed by the governor of Potosi according to the funds of the several mines, each being paid four reals a day, and treated according to the ordinance, till they complete their periods of labour. Without this measure the benefits of the mine would cease, as no labourers could be found; the great, and sometimes useless expences incurred, and the loss which the royal treasury would sustain, if these mines were abandoned, having rendered the "mita" indispensable, and it is said to be conducted with all possible humanity. See PERU and LA PLATA.

The annual produce of these mines, at present, does not equal 550,000 or 600,000 marks of silver; but Mr. Helms is of opinion, that if they were wrought with barely moderate skill and diligence, they would yield, every year, 20, and even 30, millions of dollars. The ignorance of the Spaniards at Potosi, in the art of mining, he describes as excessive; and he represents their mode of conducting the operations of stamping, sifting, washing, quickening, and roasting the ore, as the most slovenly, wasteful, and unscientific. Their process of amalgamation is so defective, that they are scarcely able to extract two-thirds of the silver contained in the ore; and for every mark of pure silver which they obtain, they lose one, and frequently two marks of quicksilver. According to Helms there were coined, from Ja-

nuary 1, to December 31, 1790, in the royal mint at Potosi, 299,846 dollars in gold, and 3,983,176 dollars in silver. We shall here subjoin a more minute statement of the produce of these mines.

The produce of the royal duties from the mines of Potosi, between 1556 and 1780, 224 years	Dollars.	Reals
	150,570,743	2
The produce of the same from 1545 to 1556, estimated at	5,500,000	0

Corresponding produce of silver from the mines	156,070,743	2
	2,400,000,000	0

But, as great part of the silver of Potosi is known not to have paid the duties, but to have been smuggled out of the kingdom, the real produce of its mines must have been greater than what appears by the preceding estimate. It is supposed, that for more than half of the eighteenth century, the contraband trade of Potosi with the Brasils was such, that only a third of the silver from its mines paid the royal duties.

The coinage of gold in the mint of Potosi, from 1780 to 1790, a period of 11 years, was equal to	Dollars.	Reals.
	2,829,718	0
The annual coinage of gold	257,247	1
The coinage of silver in the mint of Potosi, from 1773 to 1790, a period of 18 years, amounting to	69,864,764	0
The annual coinage of silver	3,881,375	6
The annual average of the silver coinage at Potosi, from 1780 to 1790	3,960,010	7
The annual average of the gold coinage from 1780 to 1790	257,247	1
Annual average of both	4,217,258	0
The coinage of Potosi in 1791	4,365,175	0
The coinage of Peru in 1791	5,118,941	0
The total coinage of both	9,484,116	6

It may not be unacceptable to introduce in this place, for the information of our readers, some account of the three descriptions of persons, who find employment in the business of mining, in South America, with which we are furnished by the "Mercurio Peruviano." The first person is the speculator in the mines, who is often a practical miner; this person in Mexico is usually a man of considerable property, who can afford to make large advances from his own funds for carrying on his works, and to whom the whole profit of his speculation, when it succeeds, reverts. But, in Peru, he is in general a person in necessitous circumstances, who begins by borrowing money at an exorbitant interest, and ends by selling the produce of his mines at a disadvantageous rate, in order to procure the means of carrying them on. The second person is the "habilitador," who is a merchant and money-lender: he supplies the miner with the capital necessary for commencing and carrying on his speculations; and this he advances on the hardest and most oppressive terms. He obliges the miner to take one-half of the advance in money and the other half in goods, which he may not want, and which are always overcharged. He binds him also to repay the advance in "pina" or "pigna," at the end of a short period, generally of four months. "Pina" is silver bullion, freed from the quicksilver with which it has been amalgamated, but not melted. In this transaction he receives a dollar for the loan of six dollars and a half for

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four months, and he has other means of exaction, which he uses without much consideration. By this complicated system of usury and oppression, a miner, who has borrowed 325 dollars from an "habilitador," one half in money, and the other half in goods charged above their value, may find himself compelled, at the end of six months, to pay fifty-seven and a half marks of pina, worth 411 dollars, in order to obtain an acquittance of his debt. The "rescatador," or "rescatiri," is a third person, who buys "pina" from the miner, and gives him money in exchange for it. A stronger proof cannot be given of the want of spirit and activity in Peru, than that evils affecting so materially the vital interests and prosperity of the kingdom, should have been suffered to continue for so many ages without any effort to remove them. It is only since the establishment of the Royal Tribunal of Mines in 1786, that banks "de rescate," or redemption, as they are called, have been erected for that purpose in the principal mines. These banks purchase "pina" from the miners on account of the Royal Tribunal of Mines; and as they give always a fair price for it, they keep down the profits of the "rescatadores," and secure the miners from their extortions. The banks "de rescate" are also of essential service to the miners, by supplying them with quicksilver in small quantities as they have occasion for it. In the metallurgy quicksilver is indispensable, an arroba and a little falt being used for every fifty quintals of the mineral. The houses where the rock or stone is powdered are called "ingenios," a name also given by the Spaniards to fugar-mills. Those of Potosi are magnificent and extensive, and are moved by water, though it be scarce, and occasion many disputes.

To estimate the riches of the mine or pit, if a certain proportion of the mineral yield ten marks, it is esteemed rich; if eight or six, middling; or if less, poor; but at Potosi even two marks are advantageous to the adventurer. As quicksilver is absolutely necessary to the miner, he had formerly no other resource, when it was wanted, but to apply for it to the "caxas reales," which are at a great distance from many of the mines; or to purchase it from the "rescatadores," who charged most exorbitantly for it. The profits of the "rescatadores" have been so much reduced by the operation of the banks "de rescate," that a great part of the capital employed in that trade has been withdrawn from it, and laid out in advances to the miners. This increase of capital, on the part of the miners, has diminished the profits of the "habilitadores," and relieved them from the oppressions of these avaricious money-lenders. Hence the operations of mining are prosecuted with greater activity and success, and the number of bankruptcies among the miners is diminishing, so that in the end the merchants themselves will be gainers. Instead of exorbitant profits and great risks, they will have moderate gains without danger.

The banks "de rescate" in the provinces, borrow what

money they have occasion for from the collectors of the taxes, and the Royal Tribunal of Mines repays these loans to the treasury at Lima. This arrangement saves the trouble and expence of remitting the produce of the taxes in money from the provinces to the capital, which, for want of bills of exchange, was the former practice; and it prevents the provinces from being annually drained of their circulating specie by such remittances; an inconvenience to which they appear to have been subjected till the erection of the banks. Such a clumsy and inartificial system in the operations of the treasury, is a striking illustration of the little progress which commerce has made in Peru.

The banks "de rescate" in Peru, are private establishments, without any monopoly or exclusive privilege; so that the private "rescatador" is still at liberty to follow his occupation. But the great bank "de rescate" at Potosi, called the bank of San Carlos de Potosi, belongs to the crown, and enjoys exclusive privileges of purchasing "pina" from the adventurers in that celebrated mine. The bank of San Carlos was founded in 1747, by a voluntary association of the miners of Potosi, in order to liberate themselves from the intolerable oppression of the "rescatadores." In 1779, they were prevailed upon by D. Jorge Escovedo, governor of Potosi, to transfer their shares and property in the bank to the crown; notwithstanding which, the bank, in 1793, was still in a prosperous state. Besides purchasing "pina," the bank of San Carlos makes advances of money and other articles to the miners, and thus exercises at once the trades of "habilitador" and of "rescatador." These two professions are also not unfrequently conjoined by private adventurers in Peru.

We subjoin a list of the mines of Peru wrought in 1791, with an account of the quantity of gold and silver obtained from them since 1780.

Mines of Peru wrought in 1791, with the number of gold and silver mines not then wrought.

	Wrought.	Not wrought.
Gold - - -	69	29
Silver - - -	784	588
Quicksilver - - -	4	0
Copper - - -	4	0
Lead - - -	12	0

Produce of the gold and silver mines of Peru for ten years, from 1780 to 1789, both included, estimated from the produce of the royal duties.

	Dollars.	Reals de Plata.
Silver made into plate - - -	602,130	0
Silver made into ingots - - -	29,126,024	0
Gold - - - - -	4,424,035	0
Total produce - - -	34,152,189	0
Annual produce - - -	3,415,218	7

Coinage of Lima during the same Period.

	Dollars.		
	Silver.	Gold.	Total.
Annual purchase by the mint - - - -	3,328,386	520,933	3,849,319
Deduct the purchase of Moneda Macaquina - - - -	523,773	—	523,773
Remainder - - - -	2,804,613	520,933	3,325,546
Produce of the mines estimated from the duties - - -	2,972,815	442,403	3,415,218
Difference of this estimate from the amount of the coinage	+ 168,202	78,530	+ 89,672

The

The "moneda macaquina" is a provincial money which the government was at that time calling in. The surplus of silver, not carried to the mint, was probably used in plate; and the excess of the coinage of gold above the produce of the mines, was probably occasioned by the introduction of gold in bars from Potosi.

Potosi is distant 50 miles W.S.W. from La Plata. S. lat. $19^{\circ} 50'$. W. long. $67^{\circ} 36'$. Helms's Travels from Buenos Ayres by Potosi to Lima, 1806. Mercurio Peruana, &c. Lima, 1791, 1794. Pinkerton's Geography, vol. iii.

POTOSI *Nuevo*, a town of Peru, in the diocese of Lima; four miles N.E. of Lima.

POTOSKUI, a town of Russia, in the government of Tobolsk; 100 miles E. of Eniseisk. N. lat. $58^{\circ} 10'$. E. long. $95^{\circ} 14'$.

POTOWMAC. See PATOWMACK.

POTRIMPOS, the name of an ancient Prussian idol, worshipped under oaks, and to which human sacrifices of enemies were offered. Mem. de l'Acad. de Berlin, tom. ii. p. 358.

Percunos and Picosos were idols of the same kind.

POTSCHAKIN, or POCATSKY, in *Geography*, a town of Bohemia, in the circle of Bechin; 56 miles S.S.E. of Prague. N. lat. $49^{\circ} 18'$. E. long. $15^{\circ} 8'$.

POTSCHERNITZ, a town of Bohemia, in the circle of Kaurzim; 8 miles E. of Prague.

POTSIA TAM BAY, a bay on the S. coast of the island of Java. S. lat. $8^{\circ} 10'$. E. long. $111^{\circ} 21'$.

POTSTONE, *Lapis Ollaris*, *Topfstein* of Werner, in *Mineralogy*, a species of stone of the muriatic genus in the arrangement of Kirwan; the colour is greenish-grey or greenish and reddish-grey, or yellowish-grey, or sprinkled with red, or leek-green. It occurs in masses; its internal lustre is glistening and pearly; its fracture undulatingly foliated, or the folia thin, and discovering rugosities; often also slaty; fragments, long splintery, or plated; often translucent on the edges; soft and greasy to the touch; frangible with difficulty; it is found in beds with serpentine at Como in the country of the Grisons, and in Saxony. The specific gravity of that of Como, which is the most famous of this species, is 2.8729, and by the analysis of Weigleb, this contains about 0.38 of siliceous, 0.38 of magnesia, 0.07 of argill, 0.5 of iron, 0.01 of aerated calx, and still less of the sparry acid; but this analysis, as the quantity of air and water is not given, cannot be depended on. The fluor acid and calx are in too small proportion to affect the essence of the stones. This is often confounded with indurated steatites, but differs from it principally in this, that the magnesia and siliceous are in a larger proportion to each other, and the iron to both. It is distinguished from shistose talc with greater difficulty than from steatites, whose characters are very different, especially when the potstone is slaty; nevertheless their lustre, specific gravity, and feel are different. The slaty abounds in common talc. According to Sauffure, the specific gravity of that of Switzerland is 3.023. Some of these minerals absorb water; the specific gravity of the potstone of Dauphiné, which is of slaty structure before the admission of water, is 2.7687, after water has been admitted, 2.8214; that of the Swedish, before the admission of water, 2.8531, after admission, 2.8629. This substance may be turned in a lathe, and made into a variety of vessels. It is also used as a lining for furnaces, being remarkably refractory.

POTT, PERCIVAL, in *Biography*, an eminent surgeon, was born in Threadneedle-street, London, in December, 1713. His father dying in his infancy, and his mother being

left in indifferent circumstances, he was indebted to the patronage of Dr. Wilcox, bishop of Rochester, a distant relation, for the means of a good literary education, which he obtained at a private school at Darne, in Kent. Although this patronage induced his friends to recommend the church as his profession, yet he was so strongly predisposed to that of surgery, that no advice or persuasion could alter his determination. He was accordingly, in 1729, bound an apprentice to Mr. Nourse, one of the surgeons of St. Bartholomew's hospital. In this situation, he had peculiar opportunities of improvement, especially in regard to anatomy, which was at that time little cultivated in London; for Mr. Nourse was one of the few who then gave lectures upon that subject, and Mr. Pott was employed in preparing the subjects for demonstration, which laid the foundation of his accurate acquaintance with that art, which is the basis of chirurgical knowledge. While he was availing himself of the unlimited opportunities of studying the nature and progress of diseases in the hospital, and attending to practical operations, he was at the same time perusing the early writers on the art of surgery with great diligence and discrimination; often remarking that, though no great instruction was to be derived from them in respect to the practical part, yet the labour of perusal was amply repaid by the accurate description of diseases, which they drew from nature.

In 1726, at the termination of his apprenticeship, he settled in Fenchurch-street, with his mother, and rapidly multiplied his connections and friends; in 1744 he was elected assistant surgeon, and in 1749 one of the principal surgeons of St. Bartholomew's hospital. He had now before him sufficient scope for the exercise of those abilities, by which mankind have been since so much benefited. The state of surgery was still very imperfect: the severe treatment of the old school, in the operative part and local applications, continued in force; the first principles of the art, founded on the natural process and powers of healing, were not understood, and altogether overlooked; painful and escharotic dressings were continually employed; and the actual cautery was in such frequent use, that at the times when the surgeons visited the hospital, it was regularly heated and prepared as a part of the necessary apparatus. Mr. Pott's tutor rigidly adhered to the established practice, and treated with supercilious contempt the endeavours of his pupil to recommend a milder and more natural system. But the dictates of truth soon found a welcome reception with the profession, and with the world in general; and Mr. Pott lived to see these remains of barbarism exploded, and a more humane and rational plan, of which he was the chief author, universally adopted.

After the death of his mother, in 1746, he married, and removed to Bow-lane, where he carried on his professional career with increasing success. His time, indeed, was almost exclusively occupied in his professional duties, until a severe accident, occasioned by a fall from his horse, in 1756, interrupted his practical labours, and occasioned a long confinement. This was a compound fracture of the leg, which was expected to require amputation; but on the suggestion of Mr. Nourse, a successful attempt to save the limb was made. The appearance of Mr. Pott as an author was the immediate consequence of this confinement; for during this period he conceived, and partly executed his "Treatise on Ruptures," which was completed by the latter end of the year. In the following year, he published an account of the hernia congenita, a complaint not then well understood, which brought forth a paper in the Medical Commentaries from Dr. William Hunter, who claimed the priority of discovery. Mr. Pott
inserted

inserted a reply, written with elegance and urbanity, in the second edition of his Treatise on Ruptures. In 1758 he produced a sensible and well-written essay, "on Fistula Lachrymalis," which was the principal cause of the discontinuance of the operation by the actual cautery, recommended by Cheselden. In 1760, his elaborate dissertation "on Injuries in the Head" appeared, in which, with a perspicuity till then unknown, he arranged the symptoms of each particular species of injury, and pointed out the appropriate means of relief. In 1762 he published "Practical Remarks on the Hydrocele," and on some other diseases of the testis, as a supplement to his general Treatise on Ruptures.

In 1764 Mr. Pott was elected a fellow of the Royal Society, and at the same time he presented it with a singular case of hernia of the urinary bladder, which included a stone. (See *Philos. Trans.* vol. lv.) His zeal and activity for the advancement of his profession increased, rather than abated, with his increasing avocations; and, with the view of directing students to the proper objects of their inquiry, he instituted about this time a course of lectures on surgery, in which he took great pains to impress upon the minds of his pupils, that the prevention of the necessity of operations should be the first consideration of the surgeon. He was still also actively engaged with his pen, and in 1765 he published his treatise "on Fistula in Ano," a disease which had been much misunderstood, and the operations for which had been horridly severe, and destructive of the parts they were intended to relieve. The simplicity of the operation which he recommended, can only be valued by those who are acquainted with the severities till then practised in this country, and even now continued in some others. In a new edition of his book, "on Injuries to which the Head is liable from external violence," printed in 1768, he first published what he modestly called "a few general Remarks," but which is in reality a complete system, "on Fractures and Dislocations." His doctrine at first met with some opposition, but is now become almost the universal practice.

In 1769, finding a more central situation necessary, from the increasing extent of the town to the west, he purchased a house in Lincoln's-inn-Fields, in which he resided seven years. He still employed his leisure in committing to paper his observations and reflections, and in 1775 published "Chirurgical Observations relative to the Cataract, the Polypus of the Nose, the Cancer of the Scrotum, the different kinds of Ruptures, and the Mortification of the Toes and Feet," which were valuable additions to his former publications, and were marked with that spirit of observation, perspicuity of reasoning, and candour in discussing controverted points, which distinguish his other productions. In 1777 he removed to Hanover-square, and now, in consequence of the retirement of sir Cæsar Hawkins, he was led into more active professional occupations than ever. But, though he was engaged also in an extensive correspondence with different parts of the world, he still found time to add to his former publications, a "Treatise on the Necessity of Amputation in certain Cases," which he seems to have been induced to write in answer to a work of M. Bilguer, surgeon to the Prussian army, who had denied the necessity of amputating in almost any case, and to another by Tissot, "sur l'Inutilité de l'Amputation des Membres." In 1779, Mr. Pott published his "Remarks on the Palsy of the Lower Limbs," which is connected with a particular curvature of the spine; a subject which he treated with more confidence, in a subsequent publication in 1783, after a more ample experience. This was the last of his literary productions; though some other topics had occupied his attention, which,

had his life been prolonged, he would probably have committed to the press.

But, while he was in the possession of the highest professional reputation, sought after and employed by persons in the first degree of rank and power, and universally consulted by his brethren in cases of uncommon difficulty and danger, he fell a sacrifice to his own active disposition, and to a neglect of the first attack of disease. In December, 1788, he was seized with a fever, after exposure to severe cold during a visit to a patient in the country, which in a few days terminated his life, at the age of seventy-five. He was buried near his mother, in Aldermary church, Bow-lane, where a tablet was affixed, inscribed by his son, the Rev J. H. Pott, archdeacon of St. Alban's. See Earle's edition of Pott's Works, 1790; and Hutchinson's *Biog. Medica*.

POTTAGIEN, in *Geography*, a town of Samogitia; 15 miles S.S.W. of Miedniki.

POTTENDORF, a town of Austria; two miles E. of Ebenfurth.

POTTENHEIM, a town of Austria; three miles S.W. of Baden.

POTTER, CHRISTOPHER, in *Biography*, a learned divine, was born in Westmoreland in 1591. He studied at Queen's college, Oxford, of which he was afterwards a fellow. In 1635 he obtained the deanery of Worcester, and in 1646 the king nominated him to the deanery of Durham. He died the same year. He published a sermon preached at the consecration of his uncle Dr. Barnaby Potter, bishop of Carlisle. He also published some pieces on predestination, against the Calvinists.

POTTER, FRANCIS, an ingenious divine, a native of Wiltshire, was educated at Oxford; after which he took orders, and in 1637 he succeeded his father in the living of Kilmington. He had an excellent taste for painting and mechanics, and having presented an hydraulic machine to the Royal Society, he was chosen a member of that learned body. He was author of a curious book on the mystic number 666, in the Revelations, and died in 1678.

POTTER, JOHN, archbishop of Canterbury, was born, about the year 1674, at Wakefield, in which town his father kept a linen draper's shop. He received the elements of learning at his native place, and at the age of fourteen was entered of University college, Oxford. So early as 1693 he appeared as an author, and displayed the great progress which he had made in Greek literature, by a publication for the use of students, consisting of notes and various readings to Plutarch's treatise "De Audiendis Poetis," and Basil's "Oration on the most advantageous mode of studying Greek authors." He was soon after chosen fellow of Lincoln college, and taking the master's degree, he went into orders. In 1697 he published an elaborate edition of Lycophrion, which he followed by his "Archæologia Græca," which has ever since been regarded as a standard work upon Grecian antiquities, and of which there has lately been published a new edition. By these valuable writings he established his reputation at home and abroad, as a man of classical erudition, and paved the way for advancement in his own profession. In 1704 he was appointed chaplain to archbishop Tennison, with whom he resided at Lambeth, and in 1706 he proceeded to the degree of D.D., and was made chaplain in ordinary to queen Anne. He now turned his attention to topics immediately connected with his situation, and in 1707 published "A Discourse on Church Government," the object of which was to support ecclesiastical authority as distinct from that of the state, and to prove the divine institution of episcopacy. Notwithstanding this assertion of high-church principles, Dr. Potter was still regarded

as a whig, and when, in the following year, he was chosen, through the duke of Marlborough's interest, Regius professor of divinity at Oxford, and canon of Christ-church, against the competition of Dr. Smallridge, the circumstance was considered as a triumph by the whig party. In 1715 he was appointed bishop of Oxford by George I., at the same time retaining his divinity chair, the duties of which he fulfilled with great assiduity. In this same year he published a valuable edition of the "Works of Clemens Alexandrinus." He was one of the combatants in the Bangorian controversy, and wrote against Hoadly on some particular points. On the accession of George II., Dr. Potter was appointed to preach the coronation sermon, and was considered to stand high in favour with the king and queen. In 1736-7, he succeeded Dr. Wake in the archbishopric of Canterbury, which station he occupied till his death, in 1747. He was married and had a numerous family, of whom two sons and three daughters survived him. Dr. Potter was a man of order and regularity, who governed his affairs with due economy, yet was not negligent of the dignity belonging to his station. His "Theological Works" were published collectively, in three vols. 8vo. 1753. Biog. Brit.

POTTER, ROBERT, an English divine, was educated at Emanuel college, Cambridge, where he took the degree of M.A. Late in life he obtained the living of Lowestoffe, in Suffolk, and a prebend in the cathedral of Norwich. He is known as an author, by his translations of the Greek tragedians Sophocles, Euripides, and Æschylus. He wrote a vindication of Gray the poet, against Dr. Johnson. He died in 1804.

POTTER, PAUL, was born at Enkhuyfen in 1625, and learned the principles of painting from his father, Peter Potter, who was but a moderate artist; yet by the power of uncommon capacity, which he discovered even in his infancy, his improvement was so extraordinary, that he was considered as a prodigy, and appeared an expert master at the age of 15.

His subjects were landscapes, with different animals, principally cows, oxen, sheep, and goats, which he painted in the highest perfection. His colouring is pure and brilliant, and very like to nature, though sometimes not harmoniously chosen; his touch is free, and exceedingly delicate; and his figures are drawn with great skill, and finished with infinite animation. He constantly studied out of doors, making even his hours of amusement useful, by sketching the scenery and objects by which he was surrounded. He frequently etched his designs, and his prints are held in great estimation.

The pictures of Potter have obtained a price far above all proportion with their merit, in comparison with those of many of his ingenious countrymen; to which, probably, the circumstance of his dying at the age of 29 not a little contributes, as, consequently, he can have left but few pictures. Lord Grosvenor has in his collection a small work of his, for which his lordship gave 900 guineas; and has been offered, as we have heard, 1000.

POTTER, in *Geography*, a county or township of Pennsylvania, containing, in 1810, 1584 inhabitants.

POTTER'S *Clay*. See CLAY.

POTTERY, the art of making earthen pots and vessels; or the manufacture of earthen-ware.

Vessels capable of holding liquid food, and drink for the use of man, would be so essential to his immediate necessities, that their fabrication would doubtless be prior to the invention of the humblest cottage. Vessels formed by excavating pieces of wood and leather, were in all probability prior to those of earthen-ware. This manufacture,

however, is so ancient, that we have no traces to the period of its invention.

From the great perfection in which we find the porcelain of China, as far back as history will inform us, there is great reason to believe, that many centuries must have elapsed in bringing it to that state, could we even ascertain when it arrived at its climax. It is remarkable, that the oldest specimen of Chinese porcelain does not differ in its essential qualities from the most recently manufactured.

There is strong ground to suppose, that the art of pottery had been long brought to great perfection in the East, before it was known in Africa and Europe. It was afterwards cultivated by the Egyptians, from whom it descended to the Greeks and Romans.

A species of earthen-ware was manufactured in Persia, which was considered a great curiosity, on account of its metallic lustre. Something similar has lately been manufactured in this country, to which the metallic lustre is given by gold; and another with platina, having the colour of that metal.

The Romans appear to have cultivated this art to a considerable extent. The taste and elegance displayed in their form and ornamental decoration, were doubtless borrowed from what the Greeks had long before practised: the country most celebrated for this art was the ancient Etruria. It was the ambition of that enlightened manufacturer, the late Mr. Wedgwood, to equal the manufacture of Etruria, after which he named the village that has grown out of his genius and industry; let it, however, be said to the praise of this great man, that in his attempt to equal the ancients, he has very far excelled any thing of the kind yet produced, in the firmness and compactness of body, in colour, and in elegance of form. It may be truly said of Mr. Wedgwood, that he has increased the value of the raw material in a greater degree than any other manufacturer. The potteries of this country, prior to his exertions and example, produced nothing but of a flimsy fabric, destitute of taste, and scarcely fit for domestic use. Their best production was the common white ware, richly daubed with blue, to imitate the unmeaning scenes painted on the Chinese porcelain: since his time the manufactures of Staffordshire have become celebrated at home and abroad. Among these, however, the modern Etruria, occupied at present by the sons of Mr. Wedgwood, still bears a distinguished sway, and must continue to be conspicuous, so long as they possess the same spirit of improvement, to which their present establishment owes its existence.

Although very different combinations of the earth, and sometimes metallic oxyds are employed in the manufacture of earthen-ware, the ductility of these compounds, or that which admits of their being moulded into different forms, is peculiar to alumine or argillaceous earth. The natural compounds, commonly called clays, consist of pure clay or alumine, combined with flint, lime, and sometimes magnesia, and frequently also with oxyd of iron. In this latter case the pottery burns to different shades of red, proportionate to the quantity of iron. When magnesia is combined, it gives to it a soapy feel, from which it has obtained the name of soap-rock. A marked variety of this is called steatite.

The clay from which the Staffordshire ware is manufactured comes from Dorsetshire, and another variety of inferior quality from Devonshire. These are both of excellent quality for working, and possess great whiteness when burnt. These clays are valued particularly for the latter property, which arises from their being free from iron, which would give them a yellow or reddish colour.

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The clay undergoes such preparation at the place where it is procured, as to free it from stones and many other impurities. In the manufactory of Mr. Wedgewood, the most complete in the kingdom, the clay is thrown into a cylinder of cast metal, four feet high and twenty inches in diameter. In the middle of this cylinder runs a perpendicular shaft, with knives as radii at right angles to the shaft. These knives are so arranged upon the shaft, that their flat sides are in the plane of a spiral thread, so that by the revolution of the shaft the knives do not only cut any thing in their way, but constantly force downwards what may be in the cylinder, agreeably to the nature of the screw. Another set of knives is inserted in the interior surface of the cylinder, and extend to the shaft in the centre: these correspond with, and are parallel to, the moveable knives. The two sets, the one active, the other passive, have the effect of sheers in cutting the clay into small pieces, while the spiral form of the active knives forces the clay in its reduced state out at an aperture at the bottom of the cylinder, from whence it is transferred to a vat, for the purpose of mixing the clay with water. This vat is of a cylindrical form, the diameter being about four times the height. In the centre of this vat turns a perpendicular shaft, having cross arms or radii one below the other. These are connected by perpendicular staves, giving the moveable part the appearance of two opposite gates, upon the central shaft. These gates revolve in the cylinder just immersed in the pulp, the constant agitation mixing all the fine particles completely with the water, while the stony particles of greater magnitude remain at the bottom. The pulp is now passed off from this vat through a series of sieves of different degrees of firmness, which work backward and forward by machinery: this separates the gross parts from that which is fitted to enter into the composition of the ware. We will here leave this refined pulp, to go to the preparation of the flint, a certain portion of which is necessary to be united with the clay pulp, in order to constitute the potter's mass.

The flint in its crude state is the common flint used for striking fire, which principally consists of pure flint. It is first placed in a kiln and heated to a red heat; and while red-hot thrown into cold water. This process is to lessen its aggregation, and make it easier to reduce to powder. Mr. Wedgewood reduces the flints into small pieces by means of hammers, which are worked by machinery. The pieces are laid upon a strong grating, so that as they become of a certain size, they are driven through the divisions of the grate. After this process they are taken to a mill, which consists of a cylindrical pan, similar to that used for mixing the clay with water, but the arms of the upright shaft are made to carry large stones of great hardness: the stone is known by the name of *chert*. These stones are fastened to the arms of the upright shaft, so that the under side, which is perfectly flat, may move over similar passive stones. This cylindrical pan contains a certain quantity of water when the small masses of flint are introduced. The flint soon gets between the chert surfaces, which from their great hardness reduce the flint to a pulpy consistence. The finer particles become suspended in the fluid, and are run off from time to time near the top of the pan. This pulp is then passed through lawn or silk sieves in a manner similar to the clay, the part which remains in the sieve being returned to the mill to be ground over again. The pulp is always made to a certain consistence, with a view to know what quantity of flint is contained in a given measure, and the same with regard to the clay in the same state. The two pulps are now mixed together in such proportion

by measure, that the flint bears a proportion to the clay of about one to five, and sometimes one to six. They are now intimately mixed together, by an apparatus similar to that employed for mixing the clay with the water in the first instance.

It is a well-known fact that clay, when exposed to the fire, continues to shrink to the greatest heat of the best furnaces. This contraction doubtless goes on till the whole of the water is dissipated, and the clay undergoes fusion. This phenomenon is more conspicuous when the clay is pure alumine. Hence we should expect, if the clay were pure, that the same degree of heat in such clay ought to produce the same decrease of volume. The application of this principle to measure high temperatures, did not escape the sagacity of the late Mr. Wedgewood. He constructed a thermometer which measured the degree of heat in which bits of pure clay had been exposed, by their shrinkage. Plausible, however, as this idea may appear, it became almost impracticable, from the circumstance of the shrinkage of different bits, made from the same mass of clay, not being uniform.

It is found that, in proportion as pure clay is combined with the other earths, it undergoes less shrinkage; and since the great shrinkage in the manufacture of earthen-ware is attended with other inconveniences, the flint is added for the purpose of preventing the shrinkage to a certain extent. It will appear that when the shrinkage is the greatest, the ware will be the most dense, and will afford a closer fracture. Under these properties the articles are less fitted to withstand sudden changes of temperature. The shrinkage may also be diminished by pounding pieces of well-burnt clay, and mixing them with the clay that would be liable to shrink. This expedient is often resorted to in making crucibles, which require to be made of the purest clay, on account of their essential property of infusibility.

When the flint and clay, in their pulpy state, have been intimately mixed, the next process is to separate the excess of water, which is effected by evaporation. The vessel in which the pulp is placed for evaporation should expose a great surface, its breadth being about five or six feet, its length 20 to 30, and very shallow. The bottom is made of fire-bricks, and the flame of the fire, which is at one end of the brick-work, passes along a flue under the bottom. The evaporation is slow, on account of the bricks being bad conductors of heat. This inconvenience, however, is compensated by the uniform consistence which the evaporating mass acquires. When the evaporation has been continued till the mass is sufficiently stiff, it is cut out in cubical masses, and is next subjected to a process, by which the mass is rendered of uniform stiffness throughout, and fit for working. This change is brought about in the most complete manner, by allowing it to remain in a heap for a considerable time. The water in the clay may be considered as a chemical compound. Hence we may conceive that the water, by time alone, will constantly be tending to uniformity throughout the whole mass.

The operations by which this effect is facilitated, are, first by hand, and secondly, by a machine for the purpose. The first is called *sloping* or *wedging*, and consists in taking a mass of clay in both hands, and with a twist of both at the same time, the piece is separated into two pieces. They are now brought together with greater violence, but in different parts to those just separated. The piece is now separated at right angles, and two new surfaces brought in contact. This change of surface every time, sometimes 20 or 30 times, effects the uniform mixture of the different parts so completely, that if, at the commencement of the operation, the mass consisted of two distinct pieces, one black and the other

other white, at the end of the operation the mass would become of an uniform grey colour.

This latter process is usually practised immediately before the clay is made in masses of proper size for working into different articles.

This change is also effected with more dispatch by a machine, very similar to that first used for cutting the crude clay into pieces.

An upright shaft works in a cylinder of cast iron; from this the radiant knives work in the plane of a spiral thread, extending to the circumference of the cylinder. The pieces of clay are thrown into the cylinder in the state they are cut out of the evaporating vessel. The knives first act by cutting them in pieces, and force them down the cylinder like a screw. From the bottom of the cylinder extends an horizontal opening in the form of a parallelepipedon, the section being about six inches square. The clay is forced through this opening, and cut off in lengths of about one foot each. These masses are again thrown into the cylinder, and passed through in the same way several times, till they are deemed in a proper state. The masses are now, when time will admit, laid together for some time, as the workmen find that they work much better for lying longer. This we have accounted for from the equal force of affinity, which tends to establish an equilibrium of the attractive force of the clay for water in every part of the mass.

Having prepared the material, we will now proceed to describe the methods of forming it into articles of various forms. This is so very similar to the methods used in the manufacture of porcelain, which we have already described, that we shall merely state some improvements in the machinery introduced by Mr. Wedgwood. The potter's lathe, which is used for throwing the different articles of a circular form, consists of a perpendicular shaft about three feet high, having a circular piece of wood at the top, the face of which, by the shaft, turns parallel to the horizon. The lower end of the shaft runs in a step; the upper part has a neck a little below the circular piece of wood, which works in a socket. Formerly this perpendicular shaft was put in motion by a wheel, with spokes fastened upon it, which the workman moved with his foot. In others the shaft has a crank in the middle, with a long rod working upon it. This being pushed backward and forward by a second person, gave motion to the lathe. In the *porcelain* works of this country, as has been described under that article, the lathe is generally turned by a rope passing from a pulley upon the perpendicular shaft to a large wheel at a distance, which is turned by a boy. The first of these methods is convenient, as the workman can best suit the velocity to the state of the work, which varies very considerably in throwing the smallest article. The labour, however, is so great, that in throwing large articles there would be great time lost. The two other methods, although they afford much ease to the workman, are very inconvenient, as the thrower has constantly to be speaking to the turner, in order to get the proper increase of speed. Mr. Wedgwood has the whole of his lathes, both for throwing and turning, turned by the steam-engine. The perpendicular shaft of the lathe is moved by an horizontal one, which is connected by two bevel wheels. The horizontal shaft is provided with a long drum, from which a strap ascends to two conical drums reversed, and working together: this allows the strap to keep at the same degree of tightness, while it traverses from one end of the drum to the other. From these drums, which are moved by the principal one, motion is given to the lathe. During the throwing of any article, a separate piece of machinery is turned by a boy, which causes the strap to move, parallel to itself, along

the drum of the horizontal shaft, and at the same time along the conical drum. This changes the velocity very gradually to its maximum, and returns to its slowest motion, when the workman is finishing the article thrown; the strap is then thrown on to a loose pulley, which stops the lathe. The clay is first portioned into pieces sufficient for the article intended. At the same instant that the thrower places the pieces of clay on the face of the circular board, the strap is transferred from the loose pulley, and the motion commences. The boy, by turning a winch, begins to move the strap from the small end of the conical drum to the large end, when the velocity is at its maximum, and when the thrower, by means of his wet hands and a thin piece of wood, is giving the proper shape to the clay. At this point he begins to finish the article, and the strap is caused to move back from the large to the small end of the drum, when the work is finished, the machine is stopped, and the thrown article cut off at the base with a piece of small wire. It is now carried to a proper place to be dried. When it has been dried to a certain extent, which the workmen call the green state, it is then taken to the turning lathe, which is similar to the common lathe used for turning wood. These lathes, in Mr. Wedgwood's works, are turned by the steam-engine, and as, during the turning of each vessel, the velocity requires to be varied, the motion is communicated from two conical drums, similar to the throwing lathe, and the strap is made to traverse the drums by a motion given by the foot of the turner. There is also a contrivance for reversing the motion, by which the turned surface is polished.

The same degree of dryness which admits of the clay being turned in the lathe, to give it its proper finish and smoothness, is also the proper state for fixing on the handles or other appendages, which cannot be effected in the lathe. The parts to be added are previously made, and at a proper degree of dryness are attached to the round work by means of a pulpy mass, formed by clay mixed with water, which the workmen call *slip*. The joined parts are then smoothed off with a wet sponge. In this state they are taken to a stove, which is nothing more than a room provided with shelves, raised from 80 to 90 degrees of temperature. When they are fully dried, if the articles be of superior quality, they are rubbed over with a small bundle of hemp, in order to take off any small bits left after the turning and handling, and to smooth those parts which cannot be turned. The ware is now ready for the kiln, which is to convert it from a soft and tender state to a hard substance, called *biscuit*.

A great variety of pottery cannot be made on the lathe, its not being of a circular form. This is made by two different methods, the one called press-work and the other casting. The press-work is formed in moulds made of plaster, one half of the figure being on one side of the mould, and the other half on the other side: these fit accurately together. The clay is first made into two flat pieces, of the thickness of the articles: one of these is pressed into one side of the mould, and the other into the other side, the superfluous clay being cut away, leaving it a little flush above the mould. The two sides of the mould are now brought together to unite the two halves of the article. The mould is now to be separated from the clay, and the article is finished as to form. It is now dried to the green state, when it is completed with any other parts to be added. All vessels of an oval form, or such as have flat sides, are made in this way. The spouts of tea-pots, and all similar articles, are made in two halves in a similar way, and are attached to the vessels in the green state, when the handles are also put on. The handles, which are sometimes of an oval shape in their section, others fluted

and otherwise ornamented, are formed by a machine which consists of an iron cylinder, about 10 or 12 inches high and six inches in diameter. A piston is made to fit the cylinder, and works up and down by means of a screw, similar to a screw-press. In the bottom of the cylinder is a hole, filled up by a piece of metal, with an opening through it, having the figure of the handle, or other thing to be formed, in section. The cylinder is first filled with clay, and the piston introduced upon it: the latter, being forced down by the screw, forces the clay through the hole at the bottom. This is cut into proper lengths as it comes through. In this way tubes may be formed, by placing a pin in the centre of the hole at the bottom of the cylinder, equal to the interior diameter of the tube. The handles are cut from the above pieces, bent into their proper shape, and at a proper degree of dryness are attached to the vessels. The different articles formed by moulds called press-work, are finished before biscuiting, similar to those made on the lathe.

The third method of forming earthen-ware is that of casting, and is perhaps the most elegant of the three for forming articles of irregular shape. This process, in common pottery, is so similar to that employed in the porcelain manufacture, which has been described under that article, that we think it unnecessary to enter minutely into it here. The clay is used in its pulpy state, called *slip*. The moulds are made of plaster, and fit so close when put together in parts, as to hold the pulpy liquid. The plaster immediately begins to absorb the moisture contiguous to it, making a stiff mass capable of supporting itself. The liquid part is now poured out: that which remains continues to get stiffer, by more of its water being transferred to the plaster, so that in a few minutes the articles, completely formed, may be removed from the moulds. They are now dried to the green state, and finished for the biscuit kiln, in the same manner with those made by the two former methods.

When the ware is thoroughly dry, and a sufficient quantity is accumulated to fill the kiln, the next process is placing the articles in cylindrical and sometimes oval-shaped vessels, called sagars. These vessels are about six inches deep, and of different diameters, from twelve to eighteen inches. These vessels, containing the ware, are piled up in the kiln, the bottom of the superior sagar serving as a lid for the inferior one. The use of these vessels is, first, to keep fire from immediately acting upon the ware, but principally to prevent the smoke injuring its colour, previously to laying one sagar upon another. A ring of soft clay is placed round the lower one, on which is fixed the bottom of each superior sagar. This is more completely to secure the goods from the foot and the intense fire.

The kiln for porcelain is so exactly similar to that used for the species of earthen-ware of which we are treating, that we have omitted to describe the kiln under PORCELAIN, and have referred the reader to this article, to which is annexed a plan and section of the elevation. See *Plate Pottery*. The potter's kiln is generally a cylindrical cavity, covered by a flattish dome. This was formerly surrounded by a conical building, reaching something higher than the buildings adjacent. The great space between the cylindrical part, which is the proper kiln, and the surrounding circular wall, used to be considerably greater than at present, and even now is much too great. For this reason we have ventured to contract it, especially in the upper part. On this account the form in our drawing differs much from the cone, as may be seen in the elevation. This tends to obviate an evil, which is equally conspicuous in glass-houses and in potters' kilns. The great quantity of cold air which is con-

stantly ascending the cone, tends much to check the draught, and by that means renders the fuel less efficacious and economical. The cylindrical portion, L, should so nearly touch the surrounding wall at *tt*, as only just to carry off the waste smoke. *WW* is a cylindrical wall, forming the space *K*, which is the cavity in which the sagars are piled, marked with the same letters in the plan. *D* is a door-way, through which the sagars are conveyed, the space being built up with bricks when the kiln is filled. The plan is a section taken at the height *V V*. The elevation is a section at *XX*, dividing the area into two equal portions. The part from *A*, down to the opening *e*, is not comprised in the section, and is shaded lighter, to show that it is a portion of the front. It is given to represent the front view of the openings where the fire is introduced. The same is seen in the plan at *a*, and in the side view at *aa*, on each side of the elevation. *P*, in the elevation, is the space occupied by the fire, which is introduced at the opening *a*, which opens into the arched recess *A*, formed in the surrounding wall. The hole, *a*, is surrounded by a frame, made of earthen-ware or cast metal, in the shape of an horse-shoe. The flame of the fire enters the horizontal flue *g*, from whence it is free also to ascend through the chimney *b*, or branch into the circular flue *f*, by which it has access, by the intermediate flues *g*, to the central opening *l*, from whence it rises perpendicularly to the top of the kiln, where it escapes into the chimney *C*, through the openings *o*. The fire in these furnaces does not rest upon a grate, but lies upon the ground. The opening at *e*, during the firing, is built up with bricks, leaving a number of openings for the air to pass through the fire, which is piled up as high as *a* in the elevation, and sometimes a little higher: *c, c, c, c*, are large fire-bricks, forming a sort of bridge or arch over the opening *a*, and coming close up to the wall *W*. At this place a groove made in the bridge forms a perpendicular opening, which is closed by the flat brick *b*, when this opening is closed. The current of flame is more considerable through the upright chimneys *b, b*, and less through the horizontal flues *f* and *g*. The former of these currents, however, is diminished, and the latter increased, by removing the brick *b*, by which a current of cold air descends through the opening below. By means of this brick the heat is increased at top or bottom of the kiln at pleasure, the uniformity of which is of great consequence. In the plan, the upper floor of the kiln is removed, to show the direction of the flues, the fourth quarter being covered with bricks, as when the sagars are piled upon the floor. In the direction of each of the flues every other brick is left out, as may be seen by the dark shades. This gives the upper floor the appearance of being full of holes, through which the flame rises among the piles of sagars. The sagars, being of a circular or elliptical form, can be piled close together, leaving sufficient interstices for the flame to pass through. The piling is commenced at the opposite side of the kiln to the door-way *D*, and continued till the last pile is raised close to the entrance, which is then closed up with bricks, till the firing is completed. This is continued from twenty to thirty and sometimes to forty-eight hours. The whole is allowed to cool before the sagars are removed. This kiln, which has undergone trifling improvement, has many defects, as stated under the article PORCELAIN. The principal of these defects are, the fire being allowed to escape at the top of the kiln instead of the bottom, and the want of a proper supply of common air to burn the smoke.

The state in which the ware is drawn from the kiln is called biscuit: it is yet unfit for vessels, being so permeable to moisture as to allow water and other liquids to run through

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through it. This valuable property of biscuit earthen-ware has lately been applied to the construction of vessels for cooling wine and other liquids. The water passes from the inner to the outer surface, and constantly presents a humid surface to the atmosphere, which by evaporation carries off much more heat than would be carried off from dry surfaces. Mr. Leslie has lately made an useful instrument, by taking advantage of this property of the biscuit for shewing the evaporating power of the air.

The next process is to render the biscuit fit to hold liquids, by filling up the pores, and coating the surface with a vitreous substance. This process is called glazing. A great variety of substances may be used for this purpose. Pounded glass would constitute a glazing for earthen-ware, where the colour of the body is wished to be seen through the glazing. The composition for earthen-ware, which we have given in this account, is capable of forming two varieties merely from the nature of the glazing. When the glazing is transparent and colourless, the colour of the body is seen, which having a yellowish tint from the presence of a small quantity of oxyd of iron, it is called cream-coloured ware. When the glazing is rendered a little opaque and of a blueish tint, by the presence of tin or arsenic, and a small portion of oxyd of cobalt, it acquires a milky or opal appearance of a blueish-white colour. The glazing formed with pounded glass, may be considered as a compound of flint and potash, or soda; hence it can be made of different degrees of fusibility by the addition of flint or alkali. These glazes are found to have some inconveniences, the principal of which is their not expanding and contracting equably with the body. The glaze is liable to crack and sometimes peel off. Earthen-ware glazed with this substance may be frequently observed to abound with innumerable cracks on the surface, which are permeable to grease or any other fluid. Such vessels soon become very disagreeable, especially when heat is applied to them, capable of burning the substances by which they have been penetrated.

No glazing has yet been discovered for common earthen-ware which is free from the above objection, without the use of lead, which, on account of the poisonous quality of that metal, should, if possible, be avoided. The oxyd of lead, even in its vitreous state, and combined with flint or clay, is so completely soluble in acids, that bad consequences have arisen by eating pickles from jars glazed with lead.

The transparent glaze used for the cream-coloured ware, is generally composed of oxyd of lead and ground flint, in equal weights. White lead is preferred, but it is not so economical as litharge or minium. In the commonest earthen-ware, galena (sulphuret of lead) is made use of. The oxyd of lead and the flint are first ground to an extremely fine powder, and then mixed with water, to give the whole the consistency of cream. The biscuit, being first made clean, is dipped into the pulp, and drained out: it is then turned about rapidly into various positions, to prevent the glaze from lying thicker in one place than another. During this change of position the water of the glaze is absorbed by the biscuit, leaving the solid matter of uniform thickness upon the surface. This part of the process is called dipping. The ware is now placed in the sagars and put in the kiln, exactly the same as in the biscuiting process. The fire is not raised so high, nor so long continued, being only sufficient to bring the glaze into perfect fusion. Dishes and plates, when placed in the sagars for glazing, may be put one upon another, by placing small stands of earthen-ware between them, presenting three small points only to each of the surfaces. When this ware is brought from the kiln, it is considered finished.

The ware called white ware is made of the same material, and manufactured precisely in the same way, as far as the biscuiting. Formerly it used to be painted after glazing, and had a second firing, similar to porcelain. It is now printed with copper-plate prints almost always with oxyd of cobalt, which makes the figures of a blue colour. It is in this state called blue and white ware, and constitutes an important branch of the Staffordshire pottery. The subjects of the prints are generally vile imitations of the paintings on the Chinese porcelain, which are of themselves shocking.

The printing is performed while the ware is in the state of biscuit, and the glazing laid over the colouring matter. The designs for the ware are engraved upon copper-plates, and prints taken from these, as in common copper-plate printing. The surface of the paper to receive the impression is first smeared over with soft soap. The plate and the rolling-press are constantly kept warm. The colouring, which for the *blue* and *white ware* is oxyd of cobalt, is greatly diluted with some colourless earthy matter: it is ground up with boiled linseed oil, such as is used for printing ink: its consistency, when laid on the plate, being that of soft paste. The paper, prepared as above mentioned, is now laid upon the plate, and passed through the rolling-press. The printed part is now cut out of the paper, and being moistened is laid upon the biscuit. The colouring matter is now instantly absorbed by the biscuit. This being done, the paper is washed from the biscuit in a tub of clean water. The colouring matter will now be seen very plain on the surface of the pottery.

The ware, having received the colouring matter, is now set to dry up the water, and is then dipped in the glazing pulp precisely in the same way as the cream-coloured ware. The glazing material, it will be remembered, differs a little from the latter, in containing a little oxyd of cobalt, which gives it a blueish tint, and gives the idea of greater whiteness. The goods are fired in sagars, as has been already described. The oxyd of cobalt now becomes of a beautiful blue, under the glaze. If, instead of the cobalt, a mixture of the oxyds of iron and manganese be employed, the figures will appear of a black colour, which gives the effect of an engraving, and is much more beautiful and consistent than the cobalt. In some potteries *penciling* is practised to great extent. This consists in laying on the colours with enamel, after the glazing. This work is very expensive, and is not so general as formerly. This process is so similar to that used in painting *porcelain*, that we shall refer the reader to that article.

Lately, another variety of ware has been introduced, which is by the potters called *lustre*: it consists in fixing gold or platina upon the surface of the glazing. The substance from which the platina lustre is procured, is obtained by dissolving platina in equal parts of the nitric and muriatic acids with heat. When the whole is dissolved, add to the solution a solution of muriat of ammonia, but yellow precipitate will fall to the bottom: continue to add the latter till no more is precipitated: decant off the clear liquor, and add fresh portions of hot water, till it becomes tasteless: drive off the first portion of water by heat, and preserve the dry powder for use: let this powder be ground, with a small portion of enamel, in oil of turpentine: spread this thinly over the glazed surface of the plain earthen-ware above described. The ware is now to be exposed to the heat of an enamel kiln, which is a red heat. The platina assumes its metallic form, which acquires greater brilliancy by the presence of the glaze.

The precipitates from gold may be laid on in the same way. The glazed ground, however, on which the gold is laid,

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laid, is of a brown colour by adding the oxyds of iron and copper to the glazing matter. By this means the yellow colour of the gold with the brown glaze, gives the lustre the colour more of copper than of gold. It is probable that the lustre is, or may be produced by smearing the glazed surface with the liquid solution of the metal, in a very dilute state. The liquid may contain a little gum, and a little enamel mixed with it, when spread upon the articles to be lusted.

A very coarse earthen-ware made in Persia, which we have alluded to in a former part of this article, possesses metallic lustre, which is doubtless given by gold in the way just described.

The most perfect pottery, particularly so far as regards excellence of workmanship, has been manufactured by the late Mr. Wedgwood, and since by his sons. Among the most superb of their productions are their imitations of jasper, manufactured into vases, medallions, and other ornamental forms. The substance of which they form their mortars, and a variety of chemical utensils, is extremely hard, and is not acted upon by acids.

The black and the yellow ware made by Messrs. Wedgwoods, of which the late Mr. Wedgwood was the inventor, possesses great elegance, and a very compact body. The black ware owes its colour to the presence of oxyd of iron, and a small portion of oxyd of manganese. The yellow ware, which is similar in texture, owes its colour to the presence of a little iron alone. A great number of places furnish natural products capable of assuming this yellow tint. The compactness of the body is effected by using less flint in the composition, and giving it more heat in the burning. This biscuit is so compact that it does not require to be glazed, and this is what constitutes its great excellence. Its beauty is much greater in being destitute of the glaze or vitreous coating, which, when it is managed in the best way possible, is but a miserable imitation of a polished surface. That species of ware which, from its great hardness, has been called stone-ware, is not encouraged so much as it deserves. It is employed for the most common, and the cheapest articles, when it ought to be used for all domestic pottery. Every other kind, excepting the true porcelain, is objectionable on account of its porous texture, and the lead contained in their glaze. Every species of clay capable of bearing a great heat, may be employed in the manufacture of stone-ware. Those which contain much oxyd of iron cannot be employed, as they would be liable to soften, and even to melt in the heat required for glazing.

This manufacture is at present almost entirely confined to bottles, particularly those used for soda water and artificial mineral waters, their texture being sufficiently close to hold gas compressed to several atmospheres.

The clay is prepared in the same way with that used in making the pottery already described. Indeed, there would be no difference in preparing the vessels for the kiln, whether formed by throwing, pressing, or casting. It is simply in the burning and glazing that the difference consists. In making the common articles, the vessels are piled up in the kiln, and exposed to the naked fire, without being defended by sagars. It is on this account that they receive a much greater heat than the common earthen-ware. When the heat has arrived at its maximum, a quantity of common salt (muriate of soda) is thrown into the body of the kiln. The salt rises in vapour, which speedily envelopes the hot ware, and glazes it as completely as in any other way, if the heat be sufficient. It is likely that the salt is decomposed, the acid flying off, while the soda combines with the earths of the pottery, forming a vitreous coating. The smoke being in

contact with the ware, gives it a brownish colour. The fracture is close and compact, and its strength much greater than the common white ware. This pottery might be extended to a variety of other articles for culinary purposes, and with proper contrivance in the construction of the kiln, articles might be made with as much taste and elegance as any other.

When the Dorsetshire clay is employed, and the ware defended from the smoke while burning, and at the time the salt is thrown in, the colour of the ware would be white, and the glaze transparent. When the clay is not sufficiently white, it may be rendered so superficially by dipping the dry ware, before it goes into the kiln, into a mixture of Cornwall clay and water in the state of a thinnish pulp. It is taken out, and turned about, as in glaze dipping, in order to spread the coating uniformly. The water is absorbed by the dry ware leaving a coating of the white Cornwall clay upon the surface. A dip made with water and a fine powder of the Cornwall stone, would answer better than the latter, as it would more easily fuse with the sublimed salt. The whiteness of the Dutch tiles is produced in this way, as the body will be found of a dirty grey colour.

The most common and worst kind of earthen-ware made in this country is formed of common clay used for bricks. The ware, after being rudely formed, is very slightly burnt, and afterwards glazed with a composition of galena (sulphuret of lead), oxyd of manganese, and the clay of the ware. The glaze is of a dark colour, approaching to black. The lead in this ware is easily attacked by acids, and should not be used where they are liable to be present. The same earthen-ware, unglazed, is used for garden pots, tiles, and tubes for draining land.

We shall conclude this article with some account of the methods of forming crucibles, retorts, and tubes of earthen-ware.

These vessels are required to possess two very essential qualities; first, they should bear the naked fire without cracking; and, secondly, they should bear the heat of the hottest furnaces without fusing. The retorts and the tubes should at least possess the first property, and require a greater closeness of body more than that required for crucibles.

The crucibles called Hessian crucibles have held a high character, both on the continent and in this country, but they are not useful for all purposes. The Dutch crucibles, which contain plumbago, are well calculated to bear sudden changes of temperature, but become very tender, and fuse at a high temperature.

A similar manufacture is carried on at Chelsea; the crucibles are quite as good as the Dutch ones, and of a much better form.

Very excellent crucibles are made of the Stourbridge clay, particularly for melting cast-iron and steel. This clay is worked up with the powder of the broken pots, which has the effect of making the pots stand sudden changes of temperature. It has been lately found, in the cast-steel works at Sheffield, that the best crucibles for their purpose are formed of the Stourbridge clay, worked up with powdered coak of pitcoal. This enables the crucibles to bear sudden changes of temperature, and at the same time to bear the greatest heat of our best air-furnaces. The Cornish clay might be used with pounded coak with similar success, and might perhaps be superior to the Stourbridge clay for earthen retorts and tubes. None of these articles should be very hard burnt, as they will, in consequence, be more liable to crack with sudden heat, and even in the regular way of bringing them up with the fire.

POTTERY, *Chinese*. See PORCELAIN.

POTTERY.

POTTERY, *The, or The Potteries*, in *Geography*, an extensive tract of country in the hundred of North Pyrehill, and county of Stafford, England, comprehends an area of about eight miles long and six broad, and is perhaps the most populous and busy of any district of similar extent in Great Britain. It derived its name from being almost exclusively appropriated to extensive manufactories of earthen-ware, for which its situation and peculiar characteristics are excellently adapted. The soil presents, in almost every part, a great variety of clays; covering rich and productive strata of coal, which lying in general near the surface, are wrought at a comparatively small expence. These strata are usually divided by veins of clays, most of which form excellent fire-bricks for constructing potter's kilns and sagars, to burn the ware in. Finer clays also are plentiful in many places; of which in former times the bodies of the wares themselves were wholly manufactured. To these advantages, joined to the inaptitude of the soil for husbandry purposes, this district is doubtless indebted for its selection as the site of its present staple manufactories. When this originally occurred is utterly unknown, but the existence of some kind of earthen-ware manufactory can be traced at least two centuries back. Its principal seat at that period was the town of Burslem, which was called a butter pottery; that is, a manufactory of pots for the preservation of butter; and under that name it is marked in several old maps: but this establishment seems to have been, even so late as the year 1686, very inconsiderable, as Dr. Plot, in his "Natural History" of the county, says, that the sale of its products was chiefly "to the poor crate-men, who carried them *at their backs* over all the country." All the ware was then of a coarse yellow, red, black, and mottled kind. The common glaze was produced by lead ore finely powdered, and sprinkled upon the pieces of ware before firing; sometimes with the addition of manganese. Occasionally, when the potter wished "to shew the utmost of his skill," he employed, instead of lead ore, calcined lead itself, but still sprinkled it on, in the same rude manner.

The era of improvement commenced about the year 1690, when two ingenious Dutchmen, of the name of Elers, settled here, and introduced the practice of adding common salt to the clay when at its highest heat, in order to give it a superficial vitrification. The same individuals also introduced the manufacture of a new species of ware, in imitation of the unglazed red china of the East; and the clays here being suitable for the purpose, they succeeded wonderfully for a first attempt, so that many of their tea-pots are said to have sold as high as a guinea each. The next improvement was made in the substance of the ware itself by a Mr. Astbury, as tradition asserts, through this incident. Being on his way to London, he happened to have powdered flint recommended to him to cure some disorder in his horse's eyes, and accordingly a flint stone was thrown into the fire, to render it more easily pulverable, which changing to a pure white by the influence of the heat, the potter was struck with the idea, that his ware might be improved by an addition of the same material to the whitest clays. He tried the experiment with tobacco-pipe clay, and the event proved fully answerable to his expectation. Thus originated the *white* stone wares, which soon supplanted the coloured ones, and continued for many years the staple branch of pottery in this country.

It was, however, about the year 1760, that the most important improvements began to be made in the Staffordshire potteries, by the late Josias Wedgewood, esq. This gentleman not only improved the composition, forms, and colours of the old wares; but likewise invented, in 1763, a new

species of ware, for which he obtained a patent, and which being honoured by her majesty's approbation and patronage, received the name of Queen's ware. Continuing his experimental researches, Mr. Wedgewood afterwards invented several other species of earthen-ware and porcelain, of which the principal are: 1. *A terra cotta*; resembling porphyry, granite, Egyptian pebble, and other beautiful stones of the siliceous or crystalline order. 2. *Basaltes*, or *black ware*; a black porcelain biscuit of nearly the same properties with the natural stone, receiving a high polish, resisting all the acids, and bearing without injury a very strong fire. 3. *White porcelain biscuit*; of a smooth wax-like appearance, of similar properties with the preceding. 4. *Jasper*; a white porcelain of exquisite beauty, possessing the general properties of basaltes; together with the singular one of receiving through its whole substance, from the admixture of metallic calces, the same colours which those calces give to glass or enamels in fusion; a property possessed by no porcelain of ancient or modern composition. 5. *Bamboo*, or cane-coloured biscuit porcelain, of the same nature as the white porcelain biscuit. And 6. *A porcelain biscuit* remarkable for great hardness, little inferior to that of agate; a property which, together with its resistance to the strongest acids, and its impenetrability to every known liquid, renders it well adapted for the formation of mortars, and many different kinds of chemical vessels. For some further account of this gentleman's discoveries; see WEDGEWOOD, JOSIAS.

The above six distinct species of ware, together with the queen's ware first noticed, have increased, by the industry and ingenuity of different manufacturers, and particularly by Mr. Wedgewood and his son, into an almost endless variety of forms for ornament and use. These, variously painted and embellished, constitute nearly the whole of the present fine earthen-wares and porcelains of English manufacture.

The number of persons who derive their support from the manufacturing part of the pottery business alone, including the wives and children of those employed in it, is computed to exceed 25,000 persons; and probably three times that number depend for bread on the labour it creates, particularly in the collieries, in procuring the raw material from several distant parts of the kingdom, and in the inland navigation connected with the same, and of the manufactured product. The pottery district lies chiefly in the parishes of Burslem and Stoke; and, as happens in most manufacturing districts, it is remarkable for the great diversity of opinion which prevails among its inhabitants on the subject of religion. Of the various sects, however, the Methodists claim a decided superiority, in point of number, over all the others. The principal towns and hamlets comprised within the limits of The Pottery, are Stoke, Hanley, Shelton, Golden-Hill, New-Field, Smith-Field, Tunstall, Long-Port, Burslem, Cobridge, Etruria, Lane-End, Lower-Lane, and Lane-Delft.

Stoke, or, as it is commonly called, Stoke-upon-Trent, has recently been constituted a market-town; and has a market-house furnished with all the accommodations requisite for its object. The church is an ancient and spacious edifice, in the later Norman style of architecture. Like most other parts of The Pottery, this town has increased in size and importance since the Staffordshire canal was cut. It contains many handsome buildings; and from its proximity to a wharf upon the canal, is most conveniently situated for trade. At this place the first steam-engine for grinding burnt flints, erected in this country, was established about twenty years ago by a gentleman named Spode. The earthen-ware manufactories here are numerous; and many of them are upon

an extensive scale. Close to the town the canal is carried over the river Trent, by means of an aqueduct constructed entirely of brick.

Hanley is situated about two miles northward from Newcastle-under-Line. This town also has a weekly market on Monday; and is distinguished for the neatness and regularity of its streets, and the elegance of many of the houses which compose them. Here is a church, which was founded in 1788; also several chapels and meeting-houses appropriated to the worship of dissenters.

Shelton is a very extensive place, but has not hitherto been constituted a market-town. It is particularly deserving of notice on account of its china manufacture, which rivals the famed porcelain of the East. The ingenious Mr. Champion of Bristol, who discovered the art of making this species of ware, expended an ample fortune in various trials, but having succeeded ultimately in bringing it to perfection, he obtained a patent for it, which he sold to the firm of Hollins, Warburton, and Co. As the canal passes Shelton, there are a public wharf and store-houses upon it, for the landing and safety of goods.

Golden-Hill, from its name, one would suppose to be a considerable and even splendid place; but on comparison it is found to be the least so of any in The Pottery. Its valuable mines of coal, however, make ample amends for its other deficiencies, and from the richness of those mines it derived its name. At the upper end of this village is Green-lane, which commands a most unbounded and beautiful prospect, on the one side over the greater part of Cheshire, and on the other over the whole extent of The Pottery, and a large portion of the country adjoining.

New-Field is well situated for manufacturing purposes, from the great plenty of coal in its immediate vicinity, but as it belongs wholly to one person, who has a handsome seat close to the village, there are fewer pottery establishments here than would otherwise have been the case.

Smith-Field, like *New-Field*, is well situated for carrying on pottery manufactories, having several strata of coal and clay close adjoining; but similar reasons prevent their being increased and extended in the same proportion as in some of the other villages in the district.

Tunstall, including its environs, is the pleasantest village in The Pottery. It stands upon high ground, at the distance of four miles northward from Newcastle, and appears to have been formerly the site of a religious institution, of which some remains were visible about the middle of the last century. These, however, are now completely gone; and a neat chapel has been erected on or near the spot which it occupied. The principal works here are for bricks and tiles; the clay being of a very superior kind for the manufacture of such articles. The tiles made from it, indeed, by good management take a blue colour, which renders them almost as fit for roofing as slates.

Long-Port is situated in a valley between Newcastle and Burslem. It has many good buildings in it, and several large and extensive manufactories; but owing to its low position, it is at times disagreeable from the smoke hanging upon it longer than it commonly does upon higher ground. The Staffordshire canal passes this village, and has a public wharf upon it.

Burslem, as already stated, is the most ancient town in the whole Pottery, and was undoubtedly the first seat of the earthen-ware manufacture in Staffordshire, and perhaps in Great Britain. Plot, in his "Natural History" of the county, makes particular mention of the potteries at this place, and points them out as the greatest of the kind then known. This author likewise gives an ample detail of the

process of making the ware in his days. Burslem has two markets weekly on Monday and Saturday, but that on Monday is by far the most considerable. Here are also regular annual fairs, established about twenty years ago, for the sale of cattle. The church, which is parochial, is an ancient structure, but has been much altered, enlarged, and modernized within the last twenty years. The Methodists have two chapels in Burslem, and are very numerous. In this town is a great variety of other sectarians.

Cobridge, which is situated partly in the parish of Burslem, and partly in that of Stoke, is a very large and populous village, and possesses spacious manufactories "of the staple articles of the country earthen-ware in it."

Etruria is a large village, in which is a seat belonging to Josias Wedgewood, esq., who has the most extensive manufactory here of any in The Pottery. The name Etruria was bestowed upon it by the father of the present proprietor, whose inventions and discoveries have not only, as before mentioned, advanced his own particular art, but have contributed in a high degree to the enlargement of natural knowledge in general.

Lane-End, *Lower-Lane*, and *Lane-Delft* adjoin, and conclude The Pottery on its eastern boundary. The first mentioned of these townships is by far the most considerable of the three, containing, according to the returns for 1811, 1097 houses, and 4930 inhabitants. Here are a chapel of ease to Stoke, a Methodist chapel, and several meeting-houses for dissenters. Among the less important places in this district, where manufactories of earthen-ware are established, are New-Chapel, Wollstanton, Redtreet, and Norton, which are the most considerable. A Description of the Country from thirty to forty Miles round Manchester, by J. Aikin, M.D., 4to. Shaw's History, &c. of Staffordshire, fol. vol. 1.

POTTING of Plants, in *Gardening*, the operation of placing or planting different sorts of plants, roots, slips, and cuttings, &c. in pots. In this business, more care and attention are necessary than is generally bestowed; as unless the work be neatly performed, it seldom succeeds well. The means of performing this sort of work, is fully explained in speaking of planting in pots in the article on planting. See **PLANTING**.

POTTLE, an English measure for corn and other dry commodities, containing two quarts: 16 pottles being = 32 quarts = 8 gallons = 4 pecks = a Winchester bushel.

POTTON, or **POTTEN**, in *Geography*, a market-town and parish in the hundred of Biggleswade, and deanery of Shefford, is situated on the border of the county adjoining Cambridgeshire, at the distance of forty-eight miles from London. The market, though not so great as formerly, is well supplied with all sorts of grain, particularly with wheat and barley, and is held on Saturday. The date of the charter has not been found on record. A fair on the festival of St. James was granted, in 1227, to Henry de Braybroke, one of the justices of the king's bench, who is supposed to have been then possessed of the manor. There are now four fairs. A great fire happened at Potton in the year 1783, when more than fifty dwelling-houses were destroyed, besides out-houses, &c. The damage was computed at upwards of 25,000*l.* Above 6000*l.* were collected for the poorest of the sufferers. Since this accident the market is said to have declined. The number of houses, according to the returns made to parliament in 1801, pursuant to the population act, was 239, that of inhabitants 1103.

The manor of Potton belonged to the family of the Nevills from

from the reign of Edward II. to the year 1431, and was afterwards, for many generations, in that of the Burgoynes of Sutton. It has since been in the Torrington family, and is now the property of Samuel Whitbread, esq. M.P. whose father purchased it in 1795. The De la Poles had a manor in Potten in the fourteenth century, which in the reign of Henry VIII. was in the family of Tanfield, being then called the manor of Potten-Mynchmaured. It has long been united to the other manor.

The great tythes of Potton were appropriated to the priory of the Minories in London, in the year 1394. They now belong to the parish of Thacksted in Essex, having been purchased, under a decree in chancery, with a sum of money bequeathed to that parish by William lord Maynard, in 1698, for charitable uses. The vicarage of Potten is in the gift of the crown. When the parish was inclosed, under an act of parliament, which passed in 1774, an allotment of land was assigned in lieu of the vicarial tythes. Lysons's *Magna Britannia*, vol. i.

POTTS GROVE, a town of America, in the county of Montgomery, and state of Pennsylvania, containing 1571 inhabitants; 27 miles N.W. of Philadelphia.

POTZDAM, a city of Brandenburg, in the Middle Mark, situated on an island, 16 miles in circumference, formed by the Havel and some neighbouring lakes. It was ceded by the family of Rochau, to whom it belonged, in the year 1416, to the electoral house; and it was made a seat of pleasure by Frederick William, who, in 1662, built a castle, afterwards enlarged by king Frederick I, and ornamented it with a fine portal. King Frederick William began to make some costly additions to the town; and he caused several morasses to be filled and built upon, and a canal 50 paces wide, and 2000 in length, to be carried on out of the Havel, through the centre of the town, to a branch of the same river. This canal has plantations of trees on both sides, and it is environed with well-built houses. The town is divided into Old and New, and the Frederickstadt, to which also belongs the Bodengraff. Frederick II. raised the castle one story, annexed to it two wings, and adorned it with magnificent apartments. The old houses near the castle have been taken down, and grand buildings erected in their room, at the king's expence. A pyramidal obelisk of four sides, composed of variegated Silesian marble, 75 feet high, is erected in the market place, having on one side a marble bust of the king; the pedestal being of white Italian marble, and at each corner is a small statue of the same. The town-church, situated not far from the castle, is a fine structure; the garrison church is large, and under the pulpit, which is constructed of marble, lies the monument of king Frederick William. The orphan-house was founded in 1724, and affords maintenance and education to above 2000 soldiers' children, of both sexes; and to this belong one Lutheran and one Calvinist preacher. To this foundation is annexed the neighbouring village of Bornstadt, together with the gold and silver manufacture, and the magazine at Berlin. In this town there are a velvet and silk manufacture, and manufactures of fabrics of other kinds. The king's guards, both horse and foot, with other battalions, have usually garrisoned this town; 15 miles S.W. of Berlin. N. lat. 52° 25'. E. long. 13°.

POTZEL. See POSSECK.

POTZLOW, a town of the Ucker Mark of Brandenburg; six miles S. of Prenzlau. N. lat. 53° 11'. E. long. 13° 54'.

POUANCE, a town of France, in the department of the Maine and Loire, and chief place of a canton, in the district of Segré; 11 miles N.W. of Segré. The place

contains 1306, and the canton 7382 inhabitants, on a territory of 262½ kilometres, in 15 communes.

POUCA, a lake of Little Bucharia. N. lat. 32° 42'. E. long. 89° 14'.

POUCA *Hotun*, a town of Little Bucharia; 10 miles W. of Tourfan.

POUCH, in the *Military Art*, is a square case or bag of leather, with a flap over it, hanging to a buff shoulder-belt of about three inches broad over the left shoulder of the infantry, used for holding cartridges. The cartridge-boxes within the pouches should be made as light as possible, with thirty-six holes in each, in order to prevent the addition of boxes to buckle round the waist, which, by blowing up, have occasioned mischief and confusion.

POUCH, in *Botany*. See SILICULA, and TETRADYNAMIA.

POUCH, *Shepherd's*. See ALYSSEUM.

POUDER, *Pie, Court*. See *Pie powder COURT*.

POUDIME, in *Geography*, a town of Turkish Armenia; 30 miles E.S.E. of Trebisond.

POUDINGORY, a town of Hindoostan, in the country of the Nayrs; four miles N. of Calicut.

POUDRE *des Chartreux*. See KERMES *Mineral*.

POVEGIA, in *Geography*, a small island in the Adriatic, near the coast of the Dogado of Venice, in the podestata of Malanocco. Damaged vessels put in here for repair.

POVENETZ, a town of Russia, in the government of Olonetz, on the N. coast of lake Onezskoe; 120 miles N.N.E. of Olonetz. N. lat. 64°. E. long. 29° 44'.

POVERTY, PENIA, in *Mythology*, was deified among the ancients; accordingly Arrian informs us, that the Gadarians adored Poverty together with "Arts," which they joined in the same worship, because Poverty is the mother of invention. Plautus, in the prologue to one of his comedies (In *Trim.*) makes this goddess one of the persons in the play, and says, that she was the daughter of Debauchery. Plato makes Love to be her son.

POVERTY Bay, in *Geography*, a bay on the E. coast of New Zealand, in the South Pacific ocean, called by the natives "Taoneroa," or Long Sand, discovered by Capt. Cook in the year 1769. The bay is shaped like a horse-shoe, and is known by an island lying close under the N.E. point; the two points that form the entrance are elevated with steep white cliffs, and lie from one another about 1½ or 2 leagues; the water in the bay is from 12 to 5 fathoms, and it has a sandy bottom, with good anchorage; but it is exposed to the wind between the S. and E. In fine weather boats may go in or out at any time of the tide; but the bar at the entrance prevents their going out, when the sea runs high. The shore of the bay, within its entrance, is a low flat sand; behind which, at a small distance, the country exhibits a diversified scene of hills and vallies, clothed with wood and covered with verdure. The country appears to be well inhabited, particularly in the vallies that lead up from the bay, where Capt. Cook daily saw smoke rising in clouds, one behind another to a great distance, till the view terminated in mountains of stupendous height. It owed its name to the inhospitable behaviour of the natives, who afforded to the Endeavour only a little wood, and no other necessary. S. lat. 38° 42'. W. long. 181° 36'.

POUGET, FRANCIS AMÈ, in *Biography*, priest of the oratory, and doctor of the Sorbonne, was born at Montpellier in 1666. He became vicar of St. Roche at Paris, and in that office he is said to have converted La Fontaine, on which subject he wrote a curious letter, published by Desmolets in his "Memoirs of Literature and of History." Among the works of which he was the author, or editor, that in the highest estimation is entitled "Instructions in the

Form of a Catechism, drawn up by the order of M. Joachim Colbert, bishop of Montpellier. He also wrote "Christian Instructions on the Duties of the Knights of Malta:" and "A Letter to M. Cardinal de Noailles, Archbishop of Paris, on the Subject of the Bull Unigenitus."

POUGET, in *Geography*, a town of France, in the department of the Herault; 18 miles N.E. of Beziers.

POUGHKEEPSIC, a town of America, in the state of New York, pleasantly situated on the E. bank of the Hudson river, half way between New York and Albany. It has five churches, and a very flourishing academy. The population in 1810 was 4670. N. lat. $41^{\circ} 41'$. W. long. $73^{\circ} 58'$.

POUGOMO, a river of Africa, which runs into the Atlantic, N. lat. 9° .

POUGUES, a town of France, in the department of the Nièvre, and chief place of a canton, in the district of Nevers, situated at the foot of a mountain, whence issues a medicinal spring; six miles N. of Nevers. The place contains 975, and the canton 9768 inhabitants, on a territory of $272\frac{1}{2}$ kilometres, in 12 communes.

POUGY, a town of France, in the department of the Aube; 13 miles N.E. of Troyes.

POVIGELIO, a town of Italy, in the department of the Panaro; 10 miles N.N.W. of Reggio.

POUILLON, a town of France, in the department of the Landes, and chief place of a canton, in the district of Dax; six miles N. of Dax. The place contains 2718, and the canton 12,830 inhabitants, on a territory of $202\frac{1}{2}$ kilometres, in 11 communes.

POUILLY, a town of France, in the department of the Côté d'Or, and chief place of a canton, in the district of Beaune; 19 miles W.S.W. of Dijon. The place contains 661, and the canton 12,561 inhabitants, on a territory of $332\frac{1}{2}$ kilometres, in 28 communes.—Also, a town of France, in the department of the Nièvre, and chief place of a canton, in the district of Cosne; 7 miles N. of La Charité. The place contains 2648, and the canton 9212 inhabitants, on a territory of $232\frac{1}{2}$ kilometres, in 11 communes.

POULO POINT, a cape on the west coast of Sumatra. S. lat. $4^{\circ} 4'$. E. long. $102^{\circ} 5'$.

POULONG-TCHEN-TANG, a mountain of Thibet. N. lat. $31^{\circ} 36'$. E. long. $104^{\circ} 36'$.

POULOU-TOU, a town of Chinese Tartary, in the country of the Monguls. N. lat. $42^{\circ} 33'$. E. long. $112^{\circ} 43'$.

POULTICE, or **POULTIS**, a form of medicine, called also cataplasm.

POULTING LUG, in *Rural Economy*, a provincial term applied to a long slender rod used in beating fruit off the trees.

POULTNEY, in *Geography*, a considerable and flourishing town of America, in the state of Vermont, and county of Rutland, near Skeelsborough; containing 1904 inhabitants.—Also, a river of Vermont, which falls into East bay.

POULTON, or *Poulton in the Fylde*, a market-town and parish in the hundred of Amounderness, and county palatine of Lancaster, England. The parish comprises the townships of Carleton, Hardhorn-with-Newton, Marton, Poulton, and Thornton; and contained, in the year 1811, 646 houses, and 3390 inhabitants. The town is situated near the mouth of the river Wyre, at the distance of 21 miles S.W. by W. from Lancaster, and $233\frac{1}{4}$ miles N.W. by N. from London. Some time after the conquest, it constituted the lordship of Roger de Poitiers; and was given by him to the abbey of Shrewsbury, together with the manor of

Biscopeham. The vicarage, however, being reserved in this grant, was subsequently impropriated to the nunnery of Sion in Middlesex, but of late years has become private property. Poulton market-day is Monday weekly; and the fairs are on the 13th February, 3d May, and 25th July. Here are three free schools.

Five miles west from Poulton is the village of *Blackpool*, which has attained, within the last 40 years, considerable distinction as a watering or bathing-place, for which its situation and other characteristics are admirably adapted. At the southern end of this village stands a building denominated Vauxhall, which was long a retreat for Popish recusants. It 1715 it was fitted up to receive the Pretender in a state of concealment, till the people should be ready for a general insurrection. Being surrounded by a lofty wall, defended by a pool and a swamp on the south and east sides, and by the sea on the west side, it could only be approached from the north; and having many secret recesses and hiding-places, it was well suited for guarding against surprise. This building is now levelled with the ground. On the sea-beach here is a fine artificial parade; and in the village a news room and coffee-room have been established for the convenience of visitors, who frequently amount to 500 in one season. For many local particulars relating to this place, see *A Description of Blackpool*, by W. Hutton, F.S.A., 1804; also *Beauties of England*, vol. ix. by John Britton, F.S.A.

POULTRY, in *Rural Economy*, a term applied to all kinds of domestic fowls brought up in the farm-yard, as cocks and hens, ducks, geese, turkeys, &c. The farm-yard cannot be said to be complete, till well stocked with these sorts of birds. The advantage of this sort of stock is, however, probably doubtful, except in particular situations, and where there is much grain cultivated. The poor villager may, however, reap in some cases benefit from products of this sort, as they are able to shift for themselves in some measure the greatest part of the year, by their feeding on insects, corn, or any thing of that nature that they can find.

It is well known that there are many different breeds of these sorts of live stock, but those best known of the fowl kind are the *game* breed, the *white* or *English* breed, the *black* or *Poland* breed, the *Darking* breed, the *large* or *shake-bag* breed, and the *Malay* breed.

The two first are much smaller breeds than the others. This sort of stock affords profit in the eggs, as well as the chickens; therefore, such as are the best layers and fitters should be chosen, which are in general the game and Poland breeds; but the other breeds have probably the advantage in respect to the size of the eggs. As food, the game and white breeds are said to be the most delicate. Some advise the choosing those that are the best breeders and best layers; the oldest being always reckoned the best fitters, and the youngest the best layers; but no sort is good for either purpose, if they are kept too fat. The best age to set a hen for chickens is from two years old to five, and the best month to set them in is February; though any month between that and October is good. A hen sits twenty-one days, whereas geese, ducks, and turkeys, sit thirty. While sitting, they should have constantly meat and drink near them, that they may not straggle from their eggs, and chill them. When fowls are fed with buck-wheat, or with hemp-seed, it is said they will lay more eggs than ordinary; and buck-wheat, either whole or ground, made into paste, which is the best way, is a grain that will fatten fowls very speedily; but the common food used is barley-meal, with milk or water; but wheat-flour moistened is by some thought

thought the best. The hen should not differ from the nature of the cock, but both be working, vigilant, and laborious, for their chickens. It is better for the hen to have no hinder claws, because they often break the eggs. Crowing hens are seldom either good layers or good breeders. To have large eggs, and in plenty, some advise the giving the hens plenty of food, and sometimes oats and animal food, with fenugreek to heat them. And to prevent hens eating their nest eggs, plaster or chalk ones may be employed.

Hens may be kept in the proportion of eight or ten to a cock.

Mr. Young notices, that when in the common way the farmer keeps but a few of each sort, that take their chance at the barn-door, for the convenience of eggs, and not to go to market when a fowl is wanted, no particular attention is requisite; but as, in some situations, they may pay well for more food and closer attention, other circumstances may be remarked. The poultry-house should contain an apartment for the general stock to roost in, another for sitting, a third for fattening, and a fourth for food. If the scale is large, there should be a fifth, for plucking and keeping feathers. If a woman is kept purposely to attend them, she should have her cottage contiguous, that the smoke of her chimney may play into the roosting and sitting rooms; poultry never thriving so well as in warmth and smoke; an observation as old as Columella, and strongly confirmed by the quantity bred in the smoky cabins of Scotland and Ireland. For sitting both turkeys and hens, nests should be made in lockers, that have lids with hinges, to confine them, if necessary; or two or three will, in sitting, crowd into the same nest. All must have access to a gravelled yard, and to grafs for range; and the building should be near the farm-yard, and have clear water near. Great attention should be paid to cleanliness and white-washing, not for appearance, but to destroy vermin. See *POULTRY-HOUSE*.

In respect to feeding them, boiled potatoes are the cheapest food; and of corn, buck-wheat. Turkeys, while young, demand incessant attention, and must be fed with alum curd and leeks, or onions; for which purpose, store of those roots should be kept where they will shoot out, and produce much food. If there be not much success in broods, and a certain high price, they will not answer; for the expenses are heavy in the management of this sort of poultry stock.

In respect to sitting hens, the eggs should constantly be such as are new-laid, and in a perfectly fresh state. The number may be ten or a dozen; but it is best not to have too many, as they can only cover a certain number.

And the broods of chickens should be so managed, as to have them coming in as the season begins to get warm in the spring; but by proper attention, they may be had at almost any time of the year. When they are first brought out, they should be attended to with care, where any are weak; and some advise their being removed into warmth, but it is probably best to let them remain with the hen. When they are two days old, rice, split grits, or very small oatmeal, may be given them, some dry, and some steeped in milk, or else crumbs of fine white bread; and when they have gained strength, curds, cheese-parings, white bread, crusts soaked in milk, barley-meal, or wheaten bread scalded, or boiled or roasted potatoes, or any such like soft meat that is small, and will be easily digested. And it is necessary to keep them in the house for some time, especially in bad weather, and not to suffer them to go abroad with the hen. Green chives chopped among their meat is very good, and will preserve them from diseases in the head; and they

should never want clear water, as puddle water is said to be apt to give them the pip.

Where the chickens are confined under coops, they should not be placed too near each other, as the hens are apt to destroy each other's chickens.

The quantity of food which young chickens mostly consume is about one or two ounces in the day, while in their early growth, as from one to two pounds in weight. They should be prevented from picking up slugs, snails, &c. from the earth as much as possible.

In the view of fattening chickens, or other poultry, various modes are used; but the best practice is probably that of confining them for a few days in dry well-ventilated places, covered so as to prevent the entrance of too much light, the fowls being taken in, in good condition, from the poultry-yards. In these situations they should be regularly fed three or four times in the course of a day with well roasted or steamed potatoes, which are probably the cheapest sort of food; as near Liverpool, in Mr. Wakefield's practice, which was upon an extensive scale, it was attended with the most complete success, the poultry thriving perfectly well. Buck-wheat is likewise an useful and cheap food for this purpose, either given whole or ground into flour; barley-meal, ground malt, and also coarse wheat-flour, when mixed up with milk, or, what is better, water, as milk runs quickly into a state of acidity, have been much recommended in this intention. From some experiments, it has been stated that pea-meal, employed in the same way, possesses a still more fattening property, and is at the same time more economical, as going much further. A confinement of eight or ten days in this way will, in general, be sufficient for effecting the business of fattening. When kept up long, fowls are extremely apt to be affected with disease. Whatever sort of food is made use of, full air and a perfect state of cleanliness are essential in all the utensils employed for the purpose, in order to prevent the food becoming sour, and the fowls affected with diseases of the kinds mentioned below.

It is stated in the Suffex Corrected Agricultural Report, that North Chappel, Kindford, and other places thereabouts, are famous for their fowls. They are fattened there to a size and perfection unknown elsewhere. The food given them is ground oats made into gruel, mixed with hog's greafe, fugar, pot-liquor, and milk; or ground oats, treacle, and suet; also sheep's pluck, &c.; and they are kept very warm. They are always crammed in the morning and at night. They mix the pot-liquor with a few handfuls of oatmeal; boil it; it is then taken off the fire, and the meal is wetted, so as to be made to roll into pieces of a sufficient size for cramming. The fowls are put into the coops two or three days before they begin to cram them, which is done for a fortnight, and then they are sold to the higliers. They will weigh, when full grown, seven pounds each, and they are sold at from 4s. 6d. to 5s. a piece; the average weight being five pounds; but there are instances of these fowls weighing double this weight. Mr. Turner, of the first of the above-named places, a tenant of lord Egremont's, crams two hundred a year. And many fat capons are fed in this manner; good ones always look pale, and waste away: great art and attention are requisite to cut them, and numbers are destroyed in the operation. The Suffex breed are too long in their body, to cut them with much success, which is done at three-quarters old.

The Darking fowls, as they are called, are all raised in the weald of Suffex; but the finest market for them is Horsham. The five-clawed breed have been considered as the best sort: this, however, is a great mistake, and it took its

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origin in some fowls with this peculiarity, that happened to be very large and fine, which laid the foundation of what have been since called *the Darking* or *five-clawed fowls*, and considered in other parts of England as the prime stock; but such a thing is hardly known in Suffex: it is a bastard breed. The fowls of the Suffex breed, which are used at the table of lord Egremont, have very frequently, it is said, astonished the company by their size.

All about the neighbourhood of Oakingham in Berkshire, also, the practice of cramming fowls is a lucrative branch of business. They are there put up in a dark place, and crammed with a paste made of barley-meal, mutton-suet, and some treacle, or coarse sugar, mixed with milk, and are found to be completely ripe in a fortnight. If they are kept longer, the fever, which is induced by this continued state of repletion, renders them red in their flesh, and unsaleable, and frequently kills them.

Whether the practice of cramming in these sorts of birds, as well as some other kinds, has any very beneficial effect in promoting the fattening process, is a point in their management which has not yet been, by any means, fully ascertained; but it is a method which, as being attended with considerable trouble, would hardly be had recourse to, in so many places, unless some sort of advantage was derived from it. The fattening would, however, in these cases, seem to depend upon the quantity of nutritious matter which is converted, and taken into the system, as prepared by the process of digestion, and not upon the quantity of food forced into the stomach. See **TURKEY**.

It is stated by a writer in the sixth volume of the Agricultural Magazine, that he has ascertained that three pounds of meal-flour, or grain of such a sort as does not cost more than a penny a pound, or to the farmer and cottager not even so much with water, and what other fare the little creature can find for itself, will feed and fatten a chicken sufficiently from the time of its bursting the shell, till that of its being of a growth, and in a condition suitable for its being carried to market. And that the allowance of another penny is sufficient for the attention and labour which its rearing requires. The prime cost of the egg may be a halfpenny. Thus it is supposed, that even in the neighbourhood of any great town a chicken that shall bring nine-pence, or rather one shilling in the market, and is, in comparison with other things, worth as much for the use of your own table, whether you be a rich or poor man, may be produced and reared at the expence of four-pence halfpenny. And further, that in proportion as fowls are kept for the consumption of the portion of farinaceous food that is daily in waste about farm-houses, the expence cannot be more than one penny; consequently, by attention to this economical mode, abundance of poultry may be had at a reasonable rate. And that old fowls, even though fed with food, for which money proportionate to the just market value must be paid, will, by their eggs, pay annually at least three times the cost of their subsistence, independently of the advantage of the manure which is afforded.

A system of farm-management in this respect is stated by Mr. Young, as practised by Mr. Boys of Kent, which appears to be extremely simple and beneficial. The labourers' wives and families who live on Mr. Boys' farm do the whole; he supplies them with what offal corn is necessary, and they return Mrs. Boys the grown fowls ready for market at three-pence each; six-pence for turkeys and geese; and three-pence for ducks; and the account, well kept, states a profit of twenty pounds a-year, after all the expences are paid, and the family well supplied. And she has likewise all the eggs without any payment. This is a

system equally beneficial to the people who undertake it, and to the farmer.

And a gentleman in that part of Berkshire which is called the "Vale of White Horse," to whose comprehensive mind nothing is too great, and to whom no object connected with the farm appears too little, favoured the writer of the Agricultural Report of that district with an inspection of his bailiff's book, from which he made the following extracts on the produce of the poultry-yard. It was the account for one year:

		<i>£</i>	<i>s.</i>	<i>d.</i>
1293 eggs, at two for 1 <i>d.</i>	-	2	13	10
166 fowls, at 3 <i>s.</i> per couple	-	12	9	0
31 ducks, at 4 <i>s.</i> 6 <i>d.</i> per couple	-	3	9	9
22 geese, at 5 <i>s.</i> each	-	5	10	0
34 turkies, at 7 <i>s.</i> 6 <i>d.</i> each	-	12	15	0
		36	17	7

It is suggested, that the estimated price here is much lower than the average of markets in general; but it will furnish some criterion of the comparative value of domestic poultry in a farming point of view.

It is conceived, that the consolidation of farms, among other ill consequences, has diminished the quantity of poultry, and consequently enhanced the price. And that though the gentleman, the yeoman, and the capital rack-renter, may sometimes rear enough for the supply of their own tables; yet it is an object beneath their notice to produce a supply for the public. Therefore the business of breeding poultry for the market is either left to the cottager, whose means and opportunities are limited, or to the little tradesman and farmer.

Eggs, too, from the same cause, are much dearer than formerly; and yet, when we consider the amazing demand and consumption, it is only wonderful they should be procured on any terms. In every part of this county, however, the supplies are pretty abundant, though rather high, of both poultry and eggs; and as fowls are the least expensive of all kinds of live-stock to a poor man, it is suggested, that he should be encouraged to profit himself and the public, by keeping as many of them as his situation will permit.

The market of Oakingham is particularly famous for fatted fowls, by which many persons in the town and neighbourhood gain a living. They are sold to the London dealers; and the sum of 150*l.* has been returned in one market-day by this traffic. Twenty dozen of these fowls were purchased for one gala at Windsor, at the rate of half a guinea a couple. At some seasons of the year, 15*s.* are paid for a couple. They constitute the principal commerce of the place.

In the county of Chester, the generality of the farmers seem to be of opinion, that it is more profitable to keep fowls for their eggs, than to breed them for the table; a considerable number, however, are brought into the different markets in the county for sale, and a still larger portion is purchased by the higglers, and carried to other markets in the large towns in the neighbouring districts. In most counties where grain is much cultivated, or where other sorts of proper food are in plenty, poultry of the fowl kinds may be advantageously reared, both for the sake of the eggs and the birds.

Birds of the poultry kind are subject to different diseases, as the *pip*, the *roup*, the *flux*, the *stoppage*, and *blindness*. The first is said to be occasioned by eating fowl meat, and drinking dirty water, or the want of water. It is known

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by a thin white scale on the tip of the tongue, which prevents the fowl from eating; and it is cured by taking off the scale with your nail, and rubbing salt upon the tongue.

The second is supposed to be a sort of swelling on the rump, which disorders the fowl prodigiously; and is observable by the feathers on the affected part standing out of their natural position, the quills being full of blood. Pulling out the feathers, opening the sore, forcing out the core, and washing the part with brine or with salt and water, will effect the cure, it is said, in most cases of this nature.

The flux is supposed to depend on eating too great a quantity of moist fermenting food, and which is cured by giving peas-meal and scalded rice with a little wax. The stoppage in fowls is a sort of costiveness, which affects them to such a degree, that they are unable to walk, and is shewn by their not eating as usual. Its cure is effected by anointing the vents, and then feeding them with corn, or small bits of bread soaked in urine; the obstructing surfaces may also be taken out of the crops. The blindness of fowls is best remedied by a change of food, and letting them have a free air.

It is observed, to distinguish whether poultry is good or not, the following circumstances should be noticed: after a chicken is killed, it will be stiff, white, and firm in the vent, if new killed; but tender and green in the vent, if stale; and if you rub your finger on the breast of a chicken, if it be new killed it will feel rough; but if stale, slippery and slimy.

Guinea fowls are a sort of bird of the fowl kind, which lay very abundantly, but which, from their retaining much of their wild nature, are apt to wander much from home, and of course cannot be kept so conveniently as the more domestic sort of fowls. They are likewise remarkably shy, and on that account liable to forsake their nests upon the least disturbance being given them. They are probably better for the table than the common fowl, as being larger, and having more of what is termed the *game* flavour; they have likewise the property of breeding abundantly when properly managed.

Turkeys are a sort of farm-stock that can only be kept with advantage in districts where grain is the predominant article of cultivation. There are two varieties of these birds in this country, the black and the speckled sorts, the former of which is, in general, the larger and more hardy. It is found that they are birds that prosper very well in open countries, where there is not much shelter to harbour vermin to destroy them: for they are naturally inclined to ramble. The hens, likewise, are so negligent of their young, that whilst they have one to follow them, they never take any care of the rest; and therefore there must be a great deal of care taken of them whilst they are young, to watch them, and to keep them warm, as being birds that cannot bear the cold. But some, where they have the conveniency of a small cover near the house, let them take their liberty, and seek their own nests; but it is only in particular places that they do well with such management. It is observed, that a gentleman had a hen-turkey of the wild kind from Virginia, from which, and an English cock, he raised a very fine breed, and much larger than the common, and reared their young ones without any care or trouble, breeding much better than the English sorts. Where they are kept with corn, they are very great feeders, and devour a great deal; but if left to their liberty when grown up, they nearly get their own living, by feeding on herbs, feeds, &c.

This is a sort of bird which breeds without the male

birds being kept constantly with the females during the laying season, as is the case with most other sorts of birds. Turkeys are very apt to straggle, often laying their eggs in secret places; and therefore must be watched, and made to lay at home. They begin to lay in March, and will sit in April. Eleven or thirteen eggs are the most they sit on. They hatch in between twenty-five and thirty days; and when they have hatched their brood they must be carefully kept warm, for the least cold kills them. They may be fed either with curds, or fresh cheese chopped in small pieces with onions or leeks, and their drink may be new milk, or milk and water. Some give them oatmeal and milk boiled thick together, into which they put onions or leeks chopped small, and sometimes eggs boiled hard, and cut in little pieces. They must be fed often, as the hen will not take much care of them, and when they have got some strength, be fed abroad in a close walled place, where they cannot stray; not letting them out till the dew is off the grass, and taking care to have them in again before the night, because the dew is very prejudicial to them.

It is noticed that these birds, when young, may be fattened with great expedition by means of boiled potatoes and good barley meal, mixed well together with chopped onions or leeks, if they be kept fed in a regular manner. The writer of *Practical Agriculture* says, that the practice of cramming them is a piece of stupid and unnecessary cruelty, as it is evident they can only fatten in proportion to the quantity of food which is digested, whatever quantity may be forced upon them; besides, they will consume it fast enough if regularly fed, which is probably the fact, however custom may have sanctioned such a method of fattening them. The author of the original *Report of Norfolk* thinks, that the fineness of the flavour in the Norfolk turkeys depends on the dryness of the soil in that district, and the extensiveness of the range which they are suffered to possess while in their young growth. The difference between the living and dead weight of a turkey, is thus stated by Mr. Young; live weight 21lb., dead weight 14lb.

The farmers in many districts of the country are prevented from the raising and keeping birds of this kind, on account of the great mischief which they do to the different sorts of field crops. They are, however, fine farm-yard birds, wherever they can be kept with propriety.

Ducks are a sort of water-fowl that may be raised with benefit in particular situations, where there is plenty of water for them to rest upon in the vicinity of the farm-stead, as they require little trouble or attention. There are different breeds, but the *English* or *white*, and the *brown* or *speckled* wild breeds, are probably to be preferred. The latter are, however, apt to wander. But it is only in such situations as above, that this sort of stock can be kept with benefit, except it be a few just for the purpose of the table. Ducks mostly begin to lay early in the year, as the latter end of January, or beginning of the following month, especially when well fed, and they require great attention at this period, as they lay a great number of eggs, and are very apt to drop them in the water, or at random in other places. One drake is sufficient for four or five ducks. When set, from ten to a dozen or thirteen eggs are a sufficient number. They sit about thirty days, and, during the time, should be fed, and have water near their nests, to prevent the eggs being injured by their leaving them too long. When hatched, the ducklings should remain with the duck in some inclosed, safe, warm, sunny place, and be well fed with crumbs of bread, grits, or barley-meal, with well roasted or boiled potatoes, well mixed, and used

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in a fresh state, sand and clean water being constantly kept beside them in shallow pans. It is observed that the duck-breeders have in general a provision of worms, snails, and other similar animals, in readiness for them when a little more advanced in their growth, as well as corn either in its ground or natural state, and that it is likewise a point of great importance to keep them perfectly clean, and to let them have plenty of dry clean straw as litter. They should never be left at full liberty till they are become quite strong, as a month or six weeks old, being constantly kept as distinct as possible from the other sorts of poultry.

In the fattening of these birds, which are greedy, but not nice feeders, grain, either in its whole, or reduced mixed state, is probably the best sort of food. The use of boiled potatoes well mixed with oatmeal, is found to be an economical and expeditious method. Much, however, depends on their being fed in an exact and regular manner, and on a proper supply of water and sand being constantly given; while at the same time they are kept in a perfectly quiet detached situation, not too much exposed to the action of light, but well aired. When fattened on animal substances, which are very expeditious in accomplishing the business, they are said to have more resemblance both in the colour and flavour of their flesh to the wild duck, than in the common method. In the acorn season they are also capable of being readily fattened on that sort of food, and are allowed to be well flavoured in their flesh from the use of it. And Mr. Weston has advised the use of malt for this purpose, which, he says, answers in the proportion of something less than a gallon *per* duck. It has an amazing quality in fattening them when young, and causes the flesh to be very delicate; when old, they readily fatten with almost any food; but for the flavour it gives the flesh, he would always prefer malt before any thing else: before they have been put up to fatten, he has likewise given them plenty of lettuces, which they are exceedingly fond of; they are, he thinks, a very cheap food for them, as they need then have but little corn in completing them.

It has been long ago observed that these birds are useful in destroying slugs, caterpillars, &c.; and the author of the Report of Middlesex thinks it is clearly ascertained, that ducks might be kept in such numbers on corn farms, as to prevent any sensible loss or destruction in their crops by worms, slugs, or caterpillars; and yet we are always hearing of great losses occasioned by these vermin. The support of a hundred or two of ducks on a farm is a trifling expence, and might be considered in the light of ensuring the young crops against being cut off. It is thought that many farmers receive more damage to a crop in one season, than would support a sufficient number of ducks to give security for twenty years.

And the establishing of decoys for the taking of wild ducks, is a point that deserves the farmer's notice in particular situations, as where there is a great extent of water in a retired situation, at a short distance from the sea. It is often done in the wilds of Lincolnshire, and in Norfolk, as well as some other districts. Mr. Marshall remarks, that the lakes and large pools, which abound in the southern hundreds of East Norfolk, are the nurseries of innumerable flights of 'wild fowl,' of various species, but principally ducks; which are taken in great numbers in decoys, formed on the margins of these waters; and which, in eligible situations, may well be considered as objects of rural economy. But that judgment is requisite in forming and managing a decoy. A gentleman in this neighbourhood had, says he, a person out of Lincolnshire to make one for him. But after a great expence of cutting pipes, fixing

skreens, nets, &c. it proved unsuccessful. The pipes were too straight, too close and confined, and too narrow at the mouth; without any banks for the wild fowl to bask upon. Upon the whole it was too much like a trap to be taken in.

He notices, that the leading principles of a decoy are these; as the wild duck is a very shy bird, and delights in retirement, the first step, therefore, is to endeavour to make the given water a peaceful asylum, by suffering the ducks to rest on it undisturbed. The same love of concealment leads them to be partial to waters whose margins abound with underwood and aquatic plants; hence, if the given water is not already furnished with these appendages, they must be provided; for it is not retirement alone which leads them into these recesses, but a search after food also. And further, that at certain times of the day, when wild fowl are off their feed, they are equally delighted with a smooth, grassy margin, to adjust and oil their plumage upon. On the close-pastured margins of large waters frequented by wild fowl, hundreds may be seen amusing themselves in this way; and, perhaps, nothing draws them sooner to a water than a convenience of this kind: hence it becomes essentially necessary to success, to provide a grassy, shelving, smooth-shaven bank at the mouth of the pipe, or canal, leading from the water to a tunnel net, fixed at the head of it; but hid from the sight among trees and aquatic plants; the difficulties that remain are those of getting them off the bank into the water, without taking wing; and of leading them up the pipe to the snare which is set for them, in the most easy manner.

With a view to get them off the bank into the water, a dog is necessary, (the more like a fox the better,) which should steal from behind a skreen of reeds, which is placed by the side of the pipe to hide the decoyman, as well as his dog. On seeing the dog, the ducks rush into the water, where the wild fowl consider themselves as safe from the enemy which had assailed them, and of course do not take wing.

Among the wild-fowl, a parcel (perhaps eight or ten) of decoy-ducks should be mixed, which will probably be instrumental in bringing them, with greater confidence, to the bank. As soon as these are in the water, they make for the pipe, at the head of which they have been constantly fed; and in which they have always found an asylum from the dog. The wild ducks follow, while the dog keeps driving behind; and, by that means, takes off their attention from the trap they are entering. When, as soon as the decoyman, who is all the while observing the operation through peep-holes in the reed-skreen, sees the entire shoal under a canopy net which covers and encloses the upper part of the pipe, he shews himself; when the wild fowl instantly take wing; but their wings meeting with an impervious net, instead of a natural canopy formed of reeds and bull-rushes, they fall again into the water, and, being afraid to recede, the man being close behind them, push forward into the tail of the tunnel net which terminates the pipe. He has been told by the proprietor of a decoy, who is himself fond of the diversion, and whose veracity he has no reason to doubt, that he has, in this way, caught 'nine dozen' at a push.

And from this use of the pipe, its form becomes obvious. It ought to resemble the outlet of a natural brook, or a natural inlet or creek of the principal water. The mouth ought to be spacious, and free from confinement, that the wild fowl, on their first rushing into the water, and while they have yet the power of recollection, may be induced to begin to follow the tame ducks; and for the same purpose it ought to be crooked, that its inward narrowness, and nets, may not, in the first instance, be perceived. The lower

part of a French horn is considered as the best form of the pipe of a decoy that can be had.

But a material circumstance remains yet to be explained. It is the invariable nature of wild fowl to take wing with their heads towards the wind; and it is always imprudent to attempt to take them in a decoy, unless the wind blows down the pipe; for, while their enemy is to leeward of them, they have less scruple to go up the pipe, making sure of an escape by their wings. What is of still more consequence, if the wind set up the pipe, when they take wing under the canopy net, some of them would probably escape (a circumstance always to be dreaded), and those which fell again into the water, would fall, of course, with their heads towards the wind, and would with great difficulty be driven into the tunnel. It is also further stated, that this point is so well known by decoymen in general, that every decoy is, when circumstances will admit of it, furnished with three or four different pipes, pointing to distinct quarters of the horizon, that no opportunity may be lost on account of the wind being in any particular point.

Contrivances of this sort for catching ducks and other kinds of birds, are pretty frequently met with in Essex, and it is noticed in the corrected Report on Agriculture for that district, that one of the best, if not the most considerable, decoys in that county, is in the island of Mersea, and rented with a small farm of about sixty acres, by Mr. Buxton, of Layer de la Haye. He was so obliging as to accompany the writer from thence into Mersea, and to shew him his decoy. Not having before viewed a decoy in the taking season, he had not remarked the precaution of each person taking a piece of lighted turf stuck on a table fork in his hand to approach the decoy; as the wild ducks, it is said, would smell the person without this caution, and immediately quit the pond. He found the expences of this decoy considerable; two men attend it, who are paid above 100*l.* a-year; repairs, nets, rent, &c. amount in all to about 300*l.* a-year. Ducks are sometimes so low as 14*s.* a dozen.

Dun birds are also frequently secured by means somewhat of this kind, in this district. The contrivances for taking these birds here were new to him. At the decoy for them near Ipswich, there is a series of very high poles set up, to which the nets are attached, for taking them in their flight; and these poles are permanent. But at this Mersea decoy, to which this bird resorts in large quantities, as well as ducks, the net poles are suspended when not at work. Mr. Lee has a decoy at Goldhanger, in the same county, in which he took, at one haul, one waggon-load and two cart-loads of dun birds; but the disturbance made, frightened such as escaped so much, that he took no more that season.

Though the expence, in some cases, as has been seen, is very considerable, yet there is often no small profit attached to these kinds of decoys.

It may be noticed, that the fattening of ducks at any age is easy, and whether it be the duckling, or the grown duck, the method to be used is exactly the same. See DUCK.

Geese are a sort of bird that will live upon commons, or any sort of pastures, and need little care or attendance; only they should have plenty of water. The largest English geese are reckoned the best, but there is a sort of Spanish geese that are much better layers and breeders. In providing geese for keeping, the author of Practical Agriculture says, great care should always be taken to procure them as large in size as possible, and from places where they have been well kept. Geese, like most other birds, begin to lay in the spring months; and the earlier this happens the better, as the price of early green geese is generally high, and in some cases it may be possible to have a second brood. Both these

purposes may be promoted by letting them be well fed with oats, grains, or some such kinds of food at the period. The goose generally lays from eight to twelve eggs. It may be known when geese are about to lay, from straw being frequently picked up and carried about by them. The length of time of sitting is about thirty days. When geese are inclined to sit, they generally shew it by remaining on their nests after laying a considerable time. In this case a proper quantity of eggs, as from ten to twelve, should be placed in the nests, and something put before them, so as to prevent the geese from being much seen. They should also have plenty of food, sand, and water, near them, in order that they may not remain long off the nests, and in that way let the eggs be too much cooled. The ganders should be left with them as guards. When the weather is warm, they generally hatch sooner than when it is cold. After the goslings are hatched, the best method is to let them remain with the geese, especially where they are strong, in some warm sunny place, that is well secured against the entrance of rats, and all other sorts of vermin, and which is properly supplied with water; being well fed with the crumbs of bread, grits, wheat, and some chopped clivers. They should remain in this confinement until they are grown strong, and capable of following the geese with ease; they may then be put into a small field or paddock, where the grass is short, till they are fit to be turned out with the geese. When they are weakly, it is customary to feed them in the house with bread soaked in milk, or a little barley-meal, and where this is done, they should, however, always be put under the geese again immediately after such feeding, and handled as little as possible: warmth in this stage being the most essential article in rearing them. They should never be suffered while very young to go in the wet, dew, or water, as the cold soon destroys them, by giving them the cramp or other diseases.

In the Lincolnshire Report it is stated to be the practice of that district, where vast numbers of these birds are annually produced, for their nests to be made of straw, and confined, so as that the eggs cannot roll out when the geese turn them, which they do every day. When near hatching, the shell is broken a little against the beak or nib of the gosling, to give air, or to enable it to receive strength to throw off the shell at a proper time: this is, however, seldom necessary. It is added, that the time of plucking them is about the beginning of April, when the fine feathers of their breasts and backs should be gently and carefully plucked: care must be taken not to pull or interrupt their down or pen feathers, and the quills should be pulled five out of each wing. And it is observed that they will bear pulling in thirteen or fourteen weeks again, or twice in a year: the feathers three times a year of the old geese and ganders, seven weeks from each pulling. The young geese may be pulled once at thirteen or fourteen weeks old, but not quilled, being hatched in March. But when late in hatching, the brood geese should not be plucked so soon as April, but the month after. When well fed with barley and oats, they thrive and do better, and their feathers grow faster, and are better in quality than where it is omitted. They must constantly have plenty of grass and water; it is further stated, that in many parts of that fenny district, great advantage is made by the frequent pluckings of the geese. At Pinchbeck, it is the practice to pluck them five times in the year, as at Lady-day, Midsummer, Lammas, Michaelmas, and Martinmas. The feathers of a dead goose are worth sixpence, those giving a pound, but plucking alive does not yield more than three-pence a head *per annum*. Some wing them only every quarter, taking ten feathers from

from each goose, which sells at five shillings a thousand. Plucked geese formerly paid in feathers one shilling a head in Wildmoor fen, but at present it is much more.

In Lancashire no sort of management is pursued with these birds, but those of taking care of their eggs while they lay, and guarding the young goslings from accidents for a week or two, while they get sufficiently strong to take care of themselves. The geese are usually plucked twice in the year, as about Midsummer and at harvest, in each of which pluckings they afford fully one shilling each, producing, on the whole, a profit of about four shillings and sixpence a piece to their owners. When they are killed, each goose yields about half a pound of feathers, independent of the former pluckings.

They are here most commonly fattened with oatmeal and potatoes, in a boiled or steamed state, the two substances being well mixed together immediately before being used. Each goose requires about two pounds and a half of meal, besides the potatoes, to render it quite fat. A good goose, when completely fattened, will weigh about nine pounds.

Vast numbers of geese are reared and kept upon the commons, in this as well as other counties.

In fattening green geese, they may be shut up when they are about two months old, and they will be fat in about a month more. They should have a little grass with their dry food, which may be any sort of grain, malt or carrots.

But in the fattening of older geese, it is commonly done when they are about six months old, in or after harvest, when they have been in the stubble field, from which food some kill them, which is a good way; but those who have a mind to have them very fat, shut them up for a fortnight or three weeks; and feed them with oats, split beans, barley-meal, or ground malt mixed with milk, the best thing to fatten them with being malt, according to Mr. Weston. Green geese will likewise feed on and fatten well with carrots, cut small, and given them. If you give store-geese rye before or about Midsummer, it will strengthen them and keep them in health, that being commonly the time when they become sickly. See CAPON, CHICKEN, COCK, EGGS, HEN, and PHASIANUS *Gallus*.

Poultry House, in *Rural Economy*, that sort of building which is contrived for the purpose of containing poultry, for laying, hatching, fattening, &c. It is observed, in a paper in the first volume of *Communications to the Board of Agriculture*, that this sort of stock, when rightly managed, might be a source of great profit to the farmer; but where many are kept they ought not to be allowed to go at large, in which case little profit can be expected, for not only many of their eggs will be lost, and many of themselves perhaps destroyed by vermin, but at certain seasons they do a great deal of mischief, both in the barn-yard and in the field. No doubt they pick up some grain at the barn-doors that might otherwise be lost, but if the straw is properly thrashed and shook, there would be very little of this. In the common careless way of thrashing, a great deal of corn is undoubtedly thrown out among the straw; but when we consider the dung of the fowls, and their feathers that get among it, and the injury these may do the cattle, this is no object. It is much better, the writer thinks, to allow the poultry a certain quantity of corn and other food, and to let the cattle have the benefit of what corn may be among the straw. He therefore concludes that poultry ought always to be confined, but not in a close, dark, diminutive hovel, as is often the case; they should have a spacious airy place, properly constructed for them. Some people are of opinion, that each sort of poultry should be kept by itself. This, however, is not absolutely necessary, for all sorts may

be kept promiscuously together, provided they have a place sufficiently large to accommodate them conveniently, and proper divisions and nests for each kind to retire to separately, which they will naturally do of themselves. And, he adds, that this mode was practised with great success at Mr. Wakefield's, near Liverpool, who kept a large stock of turkeys, geese, hens, and ducks, all in the same place: and although young turkeys are in general considered so difficult to bring up, he reared great numbers of them, the writer observes, in this manner every season, with little or no trouble whatever. For which purpose he had about three quarters, or near a whole acre, inclosed with a fence only six or seven feet high, formed of slabs set on end, or any thinning of fir or other trees split and put close together. They are fastened by a rail near the top, and another near the bottom, and are pointed sharp, which he supposes prevents the poultry flying over, for they never attempt it, although so low. Within this fence are places done up slightly, but well secured from wet, for each sort of poultry; also a pond or stream of water running through it. These poultry are fed almost entirely with potatoes boiled in steam, and thrive astonishingly well. The quantity of dung that is made in this poultry place, is also an object worth attention; and when it is cleaned out, a thin paring of the surface is at the same time taken off, which makes a valuable compost, for the purpose of manure. But for keeping poultry upon a small scale, it is only necessary to have a small shed or slight building, formed in some warm sheltered sunny situation, if near the kitchen or other place where a constant fire is kept so much the better, with proper divisions, boxes, lockers, or other contrivances for the different sorts of birds, and for their laying in, fitted up in it.

It is, however, stated in the paper before noticed, that the most magnificent poultry place perhaps that ever has been built, is at lord Penrhyn's, at Winnington, in Cheshire: it consists of a handsome regular front, extending about 140 feet: at each extremity is a neat pavilion, with a large arched window. These pavilions are united to the centre of the design, by a colonnade of small cast-iron pillars, painted white, which supports a cornice, and a slate roof, covering a paved walk, and a variety of different conveniences for the poultry, for keeping eggs, corn, &c. The doors into these are all of lattice work, also painted white, and the framing green. In the middle of the front are four handsome stone columns, and four pilasters, supporting likewise a cornice and a slate roof, under which and between the columns is a beautiful mosaic iron gate; on one side of this gate is an elegant little parlour, beautifully papered and furnished; and at the other end of the colonnade a very neat kitchen, so excessively clean, and in such high order, that it is delightful to view it. This front is the diameter or chord of a large semicircular court behind, round which there is also a colonnade, and a great variety of conveniences for the poultry: this court is neatly paved, and a circular pond and pump in the middle of it. The whole fronts towards a rich little field or paddock, called the poultry paddock, in which the poultry have liberty to walk about between meals. It happened while the writer was there to be their dinner time, at one o'clock. At this hour a bell rings, and the beautiful gate in the centre is opened. The poultry being then mostly walking in the paddock, and knowing by the sound of the bell that their repast is ready for them, fly and run from all corners, and rush in at the gate, every one striving who can get the first share in the scramble. At that time there were about 600 poultry of different kinds in the place, and although so large a number,

ber, the femicircular court is kept so very neat and clean, that not a speck of dung is to be seen. This poultry place is built of brick, excepting the pillars and cornices, and, he believes, lintels and jambs of the doors and windows, but the bricks are not seen, being all covered with a remarkably fine kind of slate from his lordship's estate in Wales. These slates are closely jointed and fastened with screw nails, on small spars fixed to the brick; they are afterwards painted, and fine white sand thrown on while the paint is wet, which gives the whole an appearance of the most beautiful freestone. This sort of cleanliness, with as free a circulation of air as possible, and a proper space for the poultry to run in, is essential to the rearing of this sort of stock with the greatest advantage and success, as in narrow confined situations they are never found to answer in so perfect a manner.

POUNCE, among *Artificers*, a little heap of charcoal dust, inclosed in some open stuff, to be passed over holes pricked in a work, in order to mark the lines or designs thereof on a paper placed underneath; which are to be afterwards finished with a pencil, a needle, or the like.

The word is formed from the French *ponce*, pumice-stone; because they anciently used pumice-stone powdered for this purpose.

Pounce is much used by embroiderers, to transfer their patterns upon their stuffs; by lace-makers, and sometimes also by engravers; and a kind made of gum sandarach, by writing-masters, which being rubbed on the paper, makes it less apt to imbibe the ink; it is, therefore, used in this manner by those who are curious in the art of the pen, by which means the writing appears more precise, sharp, and determinate.

The varnish-makers also used to dissolve it in oil of turpentine, or in linseed oil, or in spirit of wine; from which mixture is produced a kind of liquid varnish.

POUNCES, in *Falconry*, the talons or claws of a bird of prey.

POUND, **LIBRA**, a weight of a certain proportion, much used as a standard for determining the gravities and quantities of bodies.

The word is derived from the Saxon *pund*, or *pond*, *pondus*, *weight*.

We have two different pounds in England; the pound *troy*, and the pound *avoirdupois*. The pound troy consisted originally of 7680 grains, but was afterwards reduced to 5760, making 24 grains the pennyweight, instead of 32: these were grains of wheat taken from the middle of the ear. The pound troy is = 7025 French grains = 7766 Dutch ascs = 6948 Hamburgh or Cologne eschen = 7475 Spanish or Castilian grains. The Tower or Moneyers' pound, with which gold and silver were weighed in England before the reign of Henry VIII., and which is still occasionally referred to on the subject of coins, was lighter than the pound troy by 15 pennyweights troy.

One pound avoirdupois is = 7000 grains, troy weight; and, therefore, 144 lb. avoirdupois = 175 lb. troy, or 192 oz. avoirdupois = 175 oz. troy. The pound avoirdupois is = 8537 French grains = 9439 Dutch ascs.

The old commercial weight of England, which is still retained in Scotland, and which is said to have been formerly used at Amsterdam, Hamburgh, and Paris, is about $\frac{1}{12}$ th heavier than avoirdupois weight, the pound being 7600 grains troy; and, therefore, 35 lb. old weight = 38 lb. avoirdupois. This is still the weight in England by which the assize of bread is fixed by the magistrates; the peck loaf, newly baked, being 16 lb. old weight, which answers to 17 lb. 6 oz. avoirdupois. See **WEIGHT**.

For the several pounds of the several cities and countries; their proportion, reduction, division, &c. see WEIGHT.

POUND of France, according to the old system. See **MARK** and **LIVRE**.

POUND, Roman. See **LIBRA** and **LIVRE**.

POUND also denotes an imaginary money used in accounting; containing more or less, according to the several names added to it, and the several countries in which it is used. Thus in England, we say, a *pound sterling*; in France, a *pound*, or *livre Tournois* and *Parisif*; in Holland and Flanders, a *pound*, or *livre de gros*, &c.

The term took its rise hence; that the ancient pound sterling, though it only contained 240 pence, as our's does; yet each penny being equal to five of our's, the pound of silver weighed a pound troy.

The pound sterling, or English pound, contains 20 shillings, the shilling 12 pence, and the penny four farthings. Anciently there were three ways of paying a pound of money into the exchequer. 1. The payment of a *pound de numero*, which was just 20 shillings in tale. 2. *Ad scalam*, which was 6d. over and above the 20 shillings. 3. *Ad pensam*, which was giving the full weight of 12 ounces.

In estimating the fineness of gold, in our coinage, which is expressed in carats and grains, the pound, or other weight, is divided into 24 carats, and the carat into 24 grains; so that the pound carat is the 24th part of a pound troy, or half an ounce; and the carat grain is the 8th part of an ounce, or 2 dwts. 12 grains troy. An ounce carat is 20 grains, and a carat grain, in this case, is 5 grains troy. As standard gold coin is 22 carats fine, so the pound, or other weight, should contain 22 parts of pure gold, and 2 of alloy; the fineness may be expressed $\frac{22}{24}$ or $\frac{11}{12}$. The fineness of silver is expressed in ounces and pennyweights; the pound being 12 ounces, and the ounce 20 pennyweights. Standard silver coin is 11 oz. 2 dwts. fine; so that the pound should contain 222 pennyweights of pure silver, and 18 pennyweights of alloy, that is $\frac{222}{240}$ or $\frac{11}{12}$. From a pound troy of standard gold, 44½ guineas, 89 half guineas, or 133½ seven shilling pieces are coined; so that standard gold is coined at the rate of 3l. 17s. 10½d. per oz., which is called the mint price. From a pound troy of standard silver, 12½ crowns, 24½ half crowns, 62 shillings, or 124 sixpences, are coined; so that the mint price of standard silver is 5s. 2d. per ounce. The remedy or allowance for error in the gold coins is $\frac{1}{8}$ th of a carat in the pound, and the remedy for silver coins is 2 dwts. in the pound. The pound sterling contains 113 grains of fine gold, or 1718½ grains of fine silver; but if the remedy be taken into account, the pound sterling will contain at least 112½ grains of fine gold, or 1704½ grains of fine silver. See **COIN**, **COINAGE**, and **STANDARD**.

Merchants, factors, bankers, &c. use characters, or initial letters, to express the several kinds of pounds of account; as *L.* or *L.S.*, pounds sterling.

In Ireland, accounts are kept in pounds, shillings, and pence, as in England; but Irish currency differs from English in the proportion of 12 to 13. Thus 1s. English is 1s. 1d. Irish; and 1l. English, 1l. 1s. 8d. Irish. The gold and silver coins of Ireland are those of England, but they pass here for $\frac{1}{12}$ th more than their British value. Thus the guinea is worth 1l. 2s. 9d. Irish, the crown 5s. 5d., and the smaller coins in proportion. Hence English money is turned to Irish by adding $\frac{1}{12}$ th, and Irish to English by subtracting $\frac{1}{12}$ th. The copper coins of Ireland are inferior to those of England in the ratio of their currencies, 26 Irish halfpence being equal to 24 English halfpence, which make the British shilling.

In the United States, accounts were formerly kept in pounds, shillings, and pence currency; and this practice is still retained on some occasions; but the value of the currency is not the same in the different states. In Pennsylvania, New Jersey, Delaware, and Maryland, the ratio of currency to sterling is as 3 to 5; and therefore 1*l.* sterling = 1*l.* 13*s.* 4*d.* currency; or 1*l.* currency = 12*s.* sterling. In New Hampshire, Massachusetts, Connecticut, Rhode Island, and Virginia, the ratio is as 3 to 4; and therefore 1*l.* sterling = 1*l.* 6*s.* 8*d.* currency; or 1*l.* currency = 15*s.* sterling. In New York and North Carolina, the ratio is as 9 to 16; and therefore 1*l.* sterling = 1*l.* 15*s.* 6*d.* currency; or 1*l.* currency = 11*s.* 3*d.* sterling. In South Carolina and Georgia, the ratio is as 27 to 28; and therefore 1*l.* sterling = 1*l.* 0*s.* 8*d.* currency; or 1*l.* currency = 19*s.* 3*d.* sterling. Hence the exchange between England and the United States is at par, when, for every 100*l.* sterling, Pennsylvania, Maryland, &c. give 166*l.* 13*s.* 4*d.* currency; New England and Virginia, 133*l.* 6*s.* 8*d.* currency; New York and North Carolina, 177*l.* 15*s.* 6*d.* currency; Georgia and South Carolina, 103*l.* 14*s.* 0*d.* currency. A pound sterling, in the United States, is valued at four Spanish dollars and 44 cents or 1000th parts of a dollar; and no foreign coins, except the Spanish dollar, are deemed a legal tender. But the dollar is valued in the different states according to the currency of each place. Thus, in Pennsylvania, Maryland, Delaware, and Jersey, it passes for 7*s.* 6*d.*; in New England and Virginia, for 6*s.*; in New York and North Carolina, for 8*s.*; in South Carolina and Georgia, for 4*s.* 8*d.* See EXCHANGE.

POUND Flemish, a money of account in Flanders, and a money of exchange at Amsterdam and Hamburgh. The pound Flemish is equal to 6 guilders, and is divided into 20 shillings, 120 stivers, and 240 pence Flemish, also called groats. (See RIXDOLLAR.) The pound Flemish, or pond Vlans, is reckoned, at Antwerp, at 2½ rixdollars, 6 florins, 20 shillings, 120 stivers, 240 groats, or 1920 Brabant pennings. At Hamburgh, accounts are sometimes kept in pounds, shillings, and pence Flemish; the pound consisting of 20 shillings, and the shilling of 12 pence or grotes; but Flemish money is seldom used here, except in exchanges. The pound Flemish is 2½ rixdollars, 7½ marks, 20 shillings Flemish, 120 shillings Lubs, 240 grotes Flemish, 720 dreylings, or 1440 pfenings. The monies of exchange at Amsterdam are florins, stivers, and pennings, or pounds, shillings, and pence Flemish. Accordingly 10 pennings = 1 stiver; 20 stivers = 1 florin or guilder; also 12 grotes or pence Flemish, or 6 stivers = 1 shilling Flemish; 20 shillings Flemish, or 6 florins, = 1 pound Flemish; 2½ florins, or 50 stivers, = 1 rixdollar.

POUND Nails. See NAILS.

POUND, Parcus, is also an inclosure, or strong place, where cattle distrained, or caught in any trespass, are put, till they are replevied, or redeemed.

The pound is either *overt*, that is, open overhead; or *covert*, that is, close.

POUND Overt is an open pound, built upon the lord's waste; and thence also called the *lord's* pound, because he provides it for the use of himself, and his tenants.

Pound overt also includes back-sides, court-yards, pasture-grounds, or any place whatever, to which the owner of beasts impounded may come to give them meat and drink, without offence or trespass.

By stat. 1 & 2 P. & M. c. 12, no distress of cattle can be driven out of the hundred where it is taken, unless to a pound overt within the same shire, and within three miles of the place where it was taken. This is for the benefit of the

tenants, that they may know where to find and replevy the distress. And by stat. 11 Geo. II. c. 19, which was made for the benefit of landlords, any person distraining for rent may turn any part of the premises, upon which a distress is taken, into a pound *pro hac vice*, for securing of such distress. If a live distress of animals be impounded in a common pound overt, the owner must take notice of it at his peril; but if in any special pound overt, so constituted for this particular purpose, the distrainer must give notice to the owner; and in both these cases, the owner, and not the distrainer, is bound to provide the beasts with food and necessaries.

POUND Covert, or *Clofe*, on the contrary, is such a one as the owner cannot come to, for the said purpose, without trespass or offence; as some close house, cattle, fortrefs, &c.

If a distress of animals be impounded in a pound covert, as in a stable, or the like, the landlord or distrainer must feed and sustain them. (Co. Litt. 47.) A distress of household goods, or other dead chattels, which are liable to be stolen or damaged by weather, ought to be impounded in a pound covert, else the distrainer must answer for the consequences. See DISTRESS.

POUND Breach, in Law. If a distress be taken and impounded, though without just cause, the owner cannot break the pound, and take away the distress; if he doth, the party distraining may have his action, and retake the distress wherever he finds it; and for pound breaches, &c. a writ *de parco fracto* may be obtained, or an action on the case lies, whereon treble damages may be recovered, if the distress was taken for rent. 1 Inst. 161. 2 W. & M. cap. 5.

Also it is said, that all pound breaches may be inquired of in the sheriff's tourn, as they are common grievances, in contempt of the authority of the law. 2 Hawk. P. C. 67.

POUND Land; of old extent. See LIBRATA Terra.

POUNDAGE, a subsidy formerly granted to the king *ad valorem*, at the rate of 12*d.* in the pound, upon all manner of merchandize imported or exported, by all merchants, natives, denizens, and aliens. See CUSTOM.

It is called poundage, because fixed at the rate of so much *per* pound; viz. one shilling in every pound, or twenty shillings; and for English commodities exported by aliens, one shilling more.

POUNDER, in Artillery, is used to specify a certain caliber: thus, a twenty-four-pounder, a twelve, or a six-pounder, are those pieces whose balls weigh twenty-four, twelve, or six pounds. See GUNS and CANNON.

POVOA, in Geography, a town of Portugal, in Estramadura, near the Tagus; two miles N. of Lisbon.

POVOAC AON, a town on the S.W. coast of the island of Zanzibar. S. lat. 6° 20'.

POVOCAO DE NORTE, a town of Brasil, in the government of St. Paul, on the N. side of the mouth of the Iguay, or Porto de St. Pedro, and 10 miles N. of it.

POUP. See POOP.

POUPART, FRANCIS, in Biography, a celebrated anatomist and physician, was born at Mans, where he received the rudiments of his education under the fathers of oratory. He afterwards went to Paris, where he applied himself, with great assiduity, to natural history and philosophy; and, notwithstanding his narrow income, and the little prospects which these studies offered for its improvement, he persevered with ardour in the pursuit. In his researches in natural history, he had been led to the examination and dissection of insects, which turned his mind to the study of anatomy and surgery, as the means of support; for which purpose he presented

presented himself at the Hôtel Dieu, and passed his examinations with great applause, which occasioned the more surprise, when he avowed that he had had no opportunity of obtaining practical information, and was even unable to let blood. Here he studied diseases, and pursued anatomy and surgery practically during three years; and subsequently received the degree of doctor in medicine at Rheims, in 1699, and was admitted a member of the Academy of Sciences. He did not long survive to receive the rewards of his industry; for he died at Paris, in October 1708, in a state of considerable poverty, which he supported with cheerfulness. His success in anatomical investigation may be estimated from the transmission of his name, attached to an important ligament. The memoirs of the Academy comprize many of his papers, besides a "Dissertation sur la Sangue," published in the Journal des Savans; viz. a "Mémoire sur les Insectes Hermaphrodites;" "L'Histoire du Formica Leo;" that of the "Formica Pulex;" "Observations sur les Moules;" "Dissertation sur l'Apparition des Esprits," on the occasion of the adventure of St. Maur, and some other papers. He is also considered as the editor of a "Chirurgie complete," which is a compilation from many works upon that art. Eloy Dict. Hist. de la Méd.

POUPART'S *Ligament*, in *Anatomy*, the tendinous cord, which is extended from the anterior superior spine of the ilium to the tuberosity of the pubes. It is the inferior edge of the aponeurosis of the obliquus externus abdominis muscle, which has no bony attachment in the interval between the two points just mentioned. See OBLIQUUS.

POUPARTIA, in *Botany*, so named by Commerçon, because the tree is known in the isle of Bourbon by the name of *Bois de Poupart*.—Juss. 372.—Class and order, *Decandria Pentagynia*. Nat. Ord. *Terebinthaceæ*, Juss.

Ess. Ch. Calyx minute, five-cleft. Petals five. Stamens inserted into a crenate disk, under the germen. Styles converging. Drupa? with a nut of five cells. Juss.

This is a tree, whose leaves are pinnate, usually of about four pair of opposite leaflets and an odd one. Some simple leaves are interspersed. Flowers racemose, axillary and terminal; perhaps monoecious or dioecious. Jussieu took the above characters from Commerçon's papers.

POUPOU-TACLAC, in *Geography*, a mountain of Thibet. N. lat. 31° 36'. E. long. 85° 14'.

POUR faire proclamer, que null inject fines ou ordures en fosses ou river pres cities, &c. in *Law*, an ancient writ, directed to the mayor or bailiff of a city or town, requiring them to make proclamation, that none cast filth into the ditches or places near such city or town, to the nuisance thereof; and if any be cast there already, to remove the same. It is founded on the statute 12 Rich. II. cap. 13. F. N. B. 176.

POUR seiser terres la femme que tient en dower, an ancient writ, whereby the king seized the land which the wife of his tenant in capite had for her dowry, after his decease, if she married without the king's leave; by virtue of the statute of the king's prerogative. Cap. 3. F. N. B. 174.

POURALLEE. See PURLUE.

POURANAM. See VIEDAM.

POURBUS, FRANCIS, in *Biography*, the son of Peter Pourbus, a painter of some renown both in history and portraiture, was born at Bruges in 1540. Having imbibed the rudiments of the art from his father, he afterwards studied under Francis Florus; and such was his proficiency under that master, that he became his rival, and even excelled him, in colouring at least. His principal occupation was in portraiture, in which, however, he was again surpassed by

his own son Francis, called the younger, who was born in 1570, and who practised his art with deserved renown and success. He sometimes painted history, but in a formal and dry manner, united with a pleasing kind of colouring.

His own portrait, painted by himself, is honoured with a place in the Florentine gallery; and in the French collection are still preserved his portraits of Henry IV. and Catherine de Medicis. In the church of the abbey of St. Martin at Tournay was placed a picture of the Crucifixion, painted by Pourbus, which was very highly commended; but what is now become of it is not known. Pourbus the elder died in 1580, his son in 1622, at the age of 52.

POURCHOT, EDMUND, an eminent French professor of philosophy, was born at Poilly, a village in the diocese of Sens, in the year 1651. At an early age he discovered a great thirst for knowledge, and was sent to pursue his studies at the university of Paris. Here he distinguished himself by his talents and great diligence, and in 1673 he was admitted to the degree of M. A.

In the year 1677 he was appointed professor of philosophy in his own college, whither his reputation soon attracted a multitude of students, and at the opening of the "Collège des Quatre Nations," he was appointed to fill the philosophical chair in that seminary. M. Pourchot soon became dissatisfied with the Aristotelian philosophy, embraced the principles of Des Cartes, applying mathematical principles and reasonings to the discovery of physical and moral truths. He now drew up a system of philosophy, in which his object was to substitute good sense and right reason in the stead of the subtleties which he had been accustomed to teach. The philosophy of our author excited a violent opposition among the professors of the university, who employed themselves in founding the alarm of its dangerous and pernicious tendency. Its admirers, however, both within and without the university, rapidly increased in number. The professor now published his system under the title of "Institutiones Philosophicæ," which was very generally applauded, and met with an astonishing sale. His reputation as a philosopher, at this time, stood so high, that his lectures were always attended by a numerous concourse of students. His acquaintance was eagerly courted by the most celebrated literary characters of his time; Racine, Despreaux, Mabillon, Dupin, Baillet, Montfaucon, and Santeul, were his intimate associates. He was honoured with the esteem of M. Bossuet and M. de Fenelon. The latter would have procured for him the appointment of tutor to the younger branches of the royal family, but he preferred to employ his talents in the service of the university; and was seven times chosen to fill the post of rector of that body, and was Syndic for the long space of forty years. At a very advanced age he began to apply himself to the study of the Hebrew language, with a degree of ardour which soon enabled him to deliver a course of lectures upon it at the college of St. Barbe. In the midst of his numerous engagements, he found leisure to improve his "Philosophical Institutions," of which he was preparing the fourth edition for the press, when his eye-sight entirely failed him. This melancholy privation he survived between two and three years, and died at Paris in 1734, in the 83d year of his age. Besides his "Institutions," he was author of numerous "Discourses," which were given to the public in the "Acts of the University," and various "Memoirs." He assisted the learned Masclef in greatly improving the second edition of his "Grammatica Hebraica," and he aided him in drawing up the Chaldee, Syriac, and Samaritan grammars, which are combined in that edition. Moreri.

POURCOLLY, in *Geography*, a town of Bengal; 38 miles N.N.E. of Purneah.

POURHATO, a town of Chinese Tartary, in the country of Hami; 23 miles S.W. of Tchontori.

POURINISONG, a mountain of Thibet; 15 miles S. of Skirom.

POURNA-TOU-HOTUN, a town of Chinese Tartary; 18 miles W.N.W. of Nimgouta.

POUROL, a town of Thibet; 35 miles E.N.E. of Tchontori.

POURO-TCHON-TCHI, a town of Thibet; 40 miles S.W. of Tchontori.

POUROUMA, in *Botany*, Aubl. Guian. t. 341. Juss. 406, a tree of Guiana, with the habit of a *Cecropia* or *Ficus*, alternate palmate leaves, and numerous axillary corymbose flowers, whose structure is not sufficiently explained by the above authors.

POUR-PARTIE, or **POUR-PARTY**, in *Law*, a term used in opposition to *pro indiviso*; denoting the share or part of an estate held in common by parceners; which is by partition allotted to any of them.

To make *pour-partie*, is to divide and sever the lands that fall to parceners; which, before partition, they held jointly, and *pro indiviso*.

POURPRE. See **PURPURE**.

POURPRESTURE, or **PURPRESTURE**, *Pourprestura*, from the Fr. *pourpris*, an inclosure, in *Law*, is defined by Glanville to be, when any thing is unjustly occupied, that properly belonged to the king; as is the case in the encroaching on his grounds, obstructing the highways, diverting public rivers from their proper course, or building any thing over the high streets of a city; and, in the general, where any thing is done to the prejudice of the king's tenements, highways, or cities.

Crompton, in his Jurisd., says, *pourpresture* is properly when a man takes to himself, or encroaches any thing which he ought not; whether it be in jurisdiction, in land, or in franchise; and generally, where any thing is done to the nuisance of the king's tenants.

Some authors divide *pourpresture* into three kinds: the first against the king, the second against the lord, the third against a neighbour.

Pourpresture against the king, Lib. Nig. in Scacc. fol. 38. is that happening through the negligence of the sheriff, or the long continuance of wars, &c. when those that have lands near the crown-lands, inclose part of them, or lay them to their own. *Pourpresture against the lord*, is when the tenant neglects to perform what he is bound to do for the chief lord, or deprives him of his right. *Pourpresture against a neighbour*, is a nuisance against a neighbour, &c. mentioned in the Monast. tom. i.

POURRETIA, in *Botany*, so named by Willdenow, in honour of the Abbé Pourret, a French botanist of great merit, long resident at Narbonne, who has written some papers on the plants of that country, in the memoirs of the Academy of Toulouse. Willd. Sp. Pl. v. 3. 844. (Cavanillesia; Ruiz and Pavon Prodr. Gen. Fl. Peruv. v. 1. 97. t. 20.)—Class and order, *Monadelphica Polyandria*. Nat. Ord. *Columnifera*, Linn. *Malvaceae*, Juss.

Gen. Ch. Cal. Perianth inferior, simple, of one leaf, in five deep, ovate, permanent segments. Cor. Petals five, lanceolate, acute, attached to the tube of the filaments. Stam. Filaments numerous, united below into a cylindrical tube; anthers ovate, erect. Pist. Germen superior, small, ovate, pentagonal; style cylindrical, longer than the stamens; stigma capitate. Peric. Capsule of one cell, not bursting, with five large, rounded, membranous, veiny,

longitudinal wings. Seed solitary, oblong, striated, with plaited rugged cotyledons.

Ess. Ch. Calyx simple, in five deep segments. Petals five, lanceolate. Capsule of one cell, with five rounded longitudinal wings. Seed solitary.

1. *P. arborea*.—Native of Peru.—The wings of the fruit are each four inches long and two wide; the seed measures about an inch. We have no account nor figure of the foliage. The flowers are about an inch long.

POURSUIVANT, or **PURSUIVANT**, from the French *poursuivre*, to pursue, a messenger, anciently attending the king in his wars, or at council table, or in the exchequer, to be dispatched upon any occasion, or message; as, for the apprehension of a person suspected, or accused, &c.

Many of the nobility, too, had their *poursuivants*; a knight banneret was allowed a *poursuivant*, with the consent of a herald.

Upton, De Re Militari, calls the *poursuivants*, *militēs linguarēs*; because, says he, their chief honour was in *custodia linguarū*. He divides them into foot and horse *poursuivants*, *cursores equitantes et profecutores*.

There were also *poursuivants* particularly employed in martial causes, called

POURSUIVANTS at Arms, a term anciently applied to gentlemen who attended the heralds, and aspired to their office; to which they could not rise, till after seven years apprenticeship passed in this quality. See **HERALD**.

They were entirely dependent on the heralds, and assisted at their chapter; officiating for them in preparing and assigning tournaments, and all other parts of their ministry. They were baptized, at solemn feasts, with some gallant name; as Jolicœur, Verluifant, Sansmentir, &c.

Their coats of arms were different from those of the heralds, and they bore plain staves, without ornament.

The term *poursuivant*, or *pur-suivant*, is probably of French extraction, and is derived from *pour*, for, and *suivre*, to follow after; and it is applied to the officers now mentioned, as some say, because they attended in the retinue of princes and followed them into the country, to observe and record the memorable actions that occurred in jousts and other august solemnities; or, as others conceive, because they followed the heralds, to whom they were scribes, actuaries, or amanuenses, a sort of clerks, apprentices, and noviciates, candidates and probationers for the office of herald upon a vacancy. Accordingly they have been denominated "les aides des herauts," from their waiting upon them, and heralds are under an obligation of performing their functions either personally, or by their *poursuivants*, there being formerly one under each herald. Although the original of these officers has not been precisely ascertained, it is reasonable to believe that they are coeval with the heralds, on account of their dependence upon them, and of the ancient institution by which one was made the necessary step to the other. This office hath, for some centuries, been esteemed the lowest degree of the officers of arms, or the next degree under an officer of arms, and the first step of probationship for promotion. Their qualifications, as candidates for future promotion, with regard to parentage and birth, morality, capacity, and competency of age, have been formally and amply stated by ancient authors. These qualifications were formerly so much the objects of attention, that it was necessary for each candidate to produce a certificate attesting them. Anciently the term of noviciate was, as we have already said, seven years; after the expiration of which, and not sooner, the *poursuivant* was eligible to the office of herald; but in later times, and especially in this kingdom, it has been determined by a judgment in Westminster

minster Hall, that a person may lawfully be made directly, "per saltum," an herald, without being ever a pourfuiwant.

Of the great number of pourfuiwants anciently subsisting, there are now only four remaining; *blue-mantle*, *rouge-croix*, *rouge-dragon*, and *portcullice*; who are the lowest order of officers belonging to the college of arms. Their business is, to attend with the heralds in marshalling and ordering public solemnities, funerals, interviews, cavalcades, &c.

The four officers, under these denominations, have had a succession, with little interruption, and have been allowed salaries from the crown for some ages; and their titles are taken from the badges of the sovereign, or of the kingdom, or the mantle, supporter, or device of the king. For the title and office of *Blue-mantle*, see that article.

"Rouge croix," or "Red cross," is, according to sir Henry Spelman, the most ancient title of a pourfuiwant, and was taken, without doubt, from the arms ascribed to St. George, the tutelary saint of this kingdom, being argent, a cross gules. This officer was instituted by Henry V.; and from that time the succession was regularly continued until the month of April 1644, from which year this place lay vacant until the restoration, when it was revived.

"Rouge dragon," or "Red dragon," was instituted by Henry VII. on the day preceding his coronation, and denominated from the ensign of Cadwallader, from whom that king sprung in a male line. Some indeed, as sir H. Spelman, trace its origin to the right supporter of Cadwallader's shield, which supporter was itself assumed from his ensign; and others, to the banner ascribed to St. George. From the first year of Henry VIII., the names of the several officers are regularly mentioned, and it does not appear, that the office itself hath been in abeyance at any time since its establishment.

"Port-cullis" pourfuiwant was likewise erected by Henry VII., and so denominated from that timber instrument or machine, plated over with iron, made in the form of a harrow, hung up with pullies in the entrances of castles, to be let down on any occasion (see PORTCULLIS); and which instrument was one of the badges of that king, the same descending to him from the Beauforts by his mother. The succession in this office has never been interrupted since the institution.

Besides the pourfuiwants already mentioned, several others occur in our records, under titles, the significations of which are as difficult to be explained as it is to ascertain whether the persons so distinguished were English or foreign officers, or belonged to sovereigns or subjects. There have been also pourfuiwants, as well as heralds, belonging to the prince of Wales, and to the nobility.

Stow, speaking of Richard the Third's end, has these words: "His body was naked to the skin; not so much as one clout about him; and was trussed behind a pourfuiwant at arms, like a hog, or a calf."

POURTRAIT, or POURTRAITURE. See PORTRAIT and PORTRAITURE.

POURVEYANCE, or PURVEYANCE, the providing of corn, victuals, fuel, and other necessaries, for the king's house. See REVENUE.

By a stat. 12 Car. II. cap. 24. no person, under colour of pourveyance, shall take any timber, cattle, corn, or other matter, from any subject, without his free consent.

POURVEYOR, or PURVEYOR, an officer of the household, who provides and buys in corn, and other victuals, &c. for the king's house; mentioned in Magna Charta, and several statutes.

Pourveyor became a term so odious in times past, that by

stat. 35 Ed. III. the heinous name pourveyor was changed into that of *achator*, or *buyer*. The office itself was much restrained, and even abolished, by the stat. 12 Car. II. c. 24. See PRÆMUNIRE.

POUSSE PIED, in *Natural History*, the French name for a genus of shell-fish, called by writers of other nations the pollicipes.

POUSSIN, NICHOLAS, in *Biography*. This eminent painter was born at Andille, in Normandy, in 1594. Felibien says that he was descended from a noble family, which was reduced in property during the civil wars of the period preceding. He was first instructed in the art (for which he exhibited an inclination at a very early period) by Ferdinand Elle, a Flemish portrait painter, but his ideas of painting soon outran his master's powers, and having acquired friends who lent him prints from Raphael and Julio Romano, he eagerly studied to acquaint himself with their principles of composition, and soon imbibed sufficient to express his thoughts with ability.

He had, at the age of 18, left his father's house privily; not having the sanction of his parents in the pursuit of his favourite design. He first went to Paris, and afterwards accompanied a young seigneur into Poitou; but a fit of illness obliged him to return home. On his recovery he again reached Paris; and Felibien states, that he then went on towards Rome, but was, by some accident, prevented going farther than Florence. He then remained in France till 1624, and in that year attained the summit of his wishes, by arriving in the grand emporium of the arts, the city of Rome.

During his latter residence at Paris, he had acquired the friendship of Marino the poet, and had resided for some time in his house. He would also have accompanied him on his return to Italy, but was prevented by his engagements. When he arrived at Rome, his friend was unhappily in a severe state of illness, which terminated in death; but before that occurred he placed his favourite artist under the protection of cardinal Barberini, nephew of pope Urban VIII. Of the benefits which Poussin might reasonably have hoped to derive from this advantageous connection he was deprived, by his patron being dispatched on a legation from the pope; and our painter was thus left without friends in Rome. The consequence was extreme distress, and the obligation to dispose of his paintings at very low prices. Felibien says that he sold the two battle pieces which were in possession of the duke de Noailles, at the trifling sum of seven crowns each; and a picture of a prophet for eight livres. Content, however, with the means of satisfying the claims of nature, he eagerly devoted himself to study; copied several of the renowned pictures of his predecessors, those particularly by Titian, Domenichino, and Raphael, and drew stores of materials for his future labours, by giving close attention to ancient sculpture; living a life of privacy and retirement. He lodged with Il Fiamingo, the sculptor, and they together sometimes engaged themselves in measuring antique statues; but most chiefly his studies were solitary; applied to nature or to art, as they presented themselves. By accumulation of means, thus judiciously sought, and afterwards ingeniously applied, Poussin became the admired and original artist we now know him to be; the head of a class distinct from all others, and which has been rarely entered by subsequent professors. His love of simplicity and of nature led him to disregard the false glare of the artists who then held the foremost ranks in reputation; and in whose hands the art had dwindled to a systematic exhibition of the power of the pencil; rather than of sentiment or passion. His meed of

praise is therefore the greater, since he made a certain sacrifice of present profit, in the hope of restoring the art he professed, to a just elevation in the scale of utility.

The learned professor of painting in the Royal Academy has, in his last edition of Pilkington's dictionary, summed up the character of Pouffin with his accustomed acumen. "He was," says he, "on his arrival at Rome, an artist already formed, but soon found that he had more to unlearn than to follow of his former principles; he renounced the national character," (he might have added those of the existing schools of Italy,) and not only with the utmost ardour adopted, but suffered himself to be absorbed by the antique. Such was his attachment to the ancients, that he may be said to have often less imitated their spirit, than copied their relics, and painted sculpture. Their costume, their mythology, their rites, were his elements. His backgrounds are pure classic ground. He has left specimens which prove that he was sometimes sublime in his conceptions, and often in the highest degree pathetic; but history, in its strictest sense, was his department, and in that he ought to be followed. In the dramatic representation of Raphael, the action is introduced merely to shew the actors; the agents of Pouffin only appear to tell the fact; they are subordinate, they are instruments of the story; generally clear, connected, judicious; he has however sometimes attempted to tell a tale that cannot be told; sometimes obscured one that was clear in itself, by an ostentatious display of erudition; and not seldom, sacrificed the principal figures, to collateral and inferior beauties. If the celebrated series of sacraments are models of historic perspicuity; if the Ahasuerus, the deluge, the vision of Coriolanus, the infant Pyrrhus, are full of sublime and pathetic features, the vain attempt to tell by figures, what words only can tell, is proved in the testament of Eudamidas; and in the story of the adulterous woman, Christ is debased to the character and the gesticulations of an Italian juggler.

"Though Pouffin abstracted the theory of his proportions from the antique, he is seldom uniform and pure in his style of design; ideal only in parts, and oftener so in female than in male characters; he supplies, like Pietro Testa, antique heads and torsoes, with limbs and extremities transcribed from the model. As a colourist he was extremely unequal. Into the deluge, and the plague of the Philistines, he transfused the very hues of the elements whose ravages he represented, whilst numbers of his other pictures are deformed by crudity and patches.

"The excellence of Pouffin in landscape is universally allowed, and when it is the chief object of his picture, precludes all censure; but considered as the scene or background of an historical subject, the ease with which he executed it, the predilection which he had for it, often made him give it an importance which it ought not to have; it divides our attention, and from an accessory, becomes a principal part."

On the return of the cardinal Barberini to Rome, the merit of Pouffin was rescued from the oblivion in which it had been sunk. He was liberally employed by his excellence; induced freely to exhibit those treasures which his unceasing studies had accumulated; and from this time enjoyed the just reward of his industry and ingenuity, by a continued series of honours and emolument.

His fame, and many of his Italian pictures, reached his native country, and the king desiring to have his aid in cultivating the arts in France, wrote him a letter desiring his return, with which, after much hesitation, Pouffin complied, and arrived in France in 1640. He was immediately

employed by the court, and experienced the usual accompaniment of court favour, envy, which caused him enemies. Vouet among the painters, and Mercier among the architects, criticized his works with ill-natured severity, because his taste was too pure for their understandings, and by their interest caused him so much disquietude, that he requested, and obtained, permission to return to Rome, which he did in November 1642, and never more re-visited his native country; but lived till he attained his 72d year in his beloved Rome, exercising his art with esteem and respect, till within a few months of his decease.

POUST, an Indian name for a very poor and coarse kind of opium made by boiling the stalks and leaves of the opium poppy in water, and then evaporating the clear liquor to the consistence of a solid extract.

POUSTANG, in *Geography*, a mountain of Thibet. N. lat. $31^{\circ} 46'$. E. long. $97^{\circ} 39'$.

POUTA, a town of Prussian Pomerelia; 20 miles S.S.W. of Dantzick.

POU-TEOU. See Poo-roo.

POUTERIA, in *Botany*, Aubl. Guian. t. 33. Juss. 156, is *CHÆTOCARPUS* of Schreber.

POUTING, or *Whiting Pout*, in *Ichthyology*, a name given to a species of gadus, which seldom exceeds a foot in length. See *GADUS Barbatus*.

POUTON, LA, in *Geography*, a town of France, in the department of Finisterre, and chief place of a canton, in the district of Morlaix. The place contains 212, and the canton 10,361 inhabitants, on a territory of 125 kilio-metres, in seven communes.

POUTROY, LA, a town of France, in the department of the Upper Rhine, and chief place of a canton, in the district of Colmar. The place contains 2064, and the canton 10,603 inhabitants, on a territory of 160 kilio-metres, in five communes.

POUZAUGES-LA-VILLE, a town of France, in the department of the Vendée, and chief place of a canton, in the district of Fontenay-la-Comte; nine miles N.N.W. of La Châtaigneraye. The place contains 220, and the canton 15,538 inhabitants, on a territory of 380 kilio-metres, in 18 communes.

POUZILHAC, a town of France, in the department of the Gard; 8 miles E.N.E. of Uzès.

POUZIN, LA, a town of France, in the department of the Ardèche; six miles N.E. of Privas.

POWANGUR, a town of Hindoostan, in Guzerat; 60 miles S.E. of Amedabad. N. lat. $22^{\circ} 26'$. E. long. $73^{\circ} 32'$.

POWAY, a town of Hindoostan, in the circar of Gurrah; 32 miles W. of Mahur.—Also, a town of Hindoostan, in Allahabad; 24 miles N. of Jioappour.

POWCHEs, in a *Ship*. The seamen call by this name the small bulk-heads made in the hold, to stow corn, goods, or the like, that it may not shoot from one side to the other.

POWDER, or POUDEr, in *Pharmacy*, a dry medicine pulverized, or prepared by being broken and reduced into almost imperceptible atoms, either in a mortar or by chemical operations, &c.

This form of preparing is, upon the whole, the most simple, and in various respects the least objectionable; but many substances cannot be either conveniently or beneficially employed in this manner. Those that are bitter, acrid, and foetid, and of course unpleasant to the taste; those that rapidly deliquesce when exposed to the air, or are very volatile; and those which require to be given in large doses,

or which do not readily dissolve in water, belong to this class. Others cannot be reduced to powder without being much dried, and heat alters their properties; others again, particularly some resinous substances, are injured by the impalpable form of powders; and many are deteriorated by exposing their surfaces, in the operation of pulverizing them, to the action of atmospherical air, such are cinchona, rhubarb, ipecacuanha, and guaiacum. To prevent the injurious effect of air and light, powders should be generally kept in opaque or green-glass bottles: and in forming compound powders, the admixture should be rendered as complete as possible, and the mixed powder, after trituration, should be passed through a sieve. The Dublin college lays down the following general rule for the formation of powders: "Let the substances to be powdered be first dried, and then beaten in an iron mortar; then separate the finer powder by shaking it through a hair-sieve, and preserve it in close vessels."

The lighter powders may be mixed in any agreeable liquor, as tea, or water-gruel. The more ponderous will require a more consistent vehicle, as syrup, jelly, or honey. There are powders of various sorts, the principal of which are mentioned in the following articles and references.

POWDER of Algaroth. See ALGAROTH.

POWDER of Aloes, Compound, is prepared, according to the directions of the Lond. pharmacopeia, by powdering an ounce and a half of the extract of spikenard aloë and an ounce of guaiacum gum-resin separately, and then mixing them with half an ounce of the compound powder of cinnamon. This is the pulvis aloes cum guaiaco of P. L. 1787; pilulæ aromaticæ of P. L. 1745; and pilulæ de diambra of P. L. 1720.

The Dublin college directs this powder, denominated powder of aloes with guaiac, to be prepared by rubbing an ounce and a half of hepatic aloes, and an ounce of guaiac gum-resin separately to powder, and then mixing them with half an ounce of aromatic powder. These powders are warm sudorific cathartics, and may be given in doses from grs. x to ℥j: but are not much in use. See ALOES.

POWDER of Aloes with Canella is prepared, according to the Dublin Ph., by rubbing one pound of hepatic aloes and three ounces of white canella separately to powder, and then mixing them. This is omitted in the last Lond. pharmacopeia. In the shops it has been long known under the name of "Hiera picra," and is used as a domestic remedy, infused in wine or spirits. The dose may be from grs. x to ℥j.

POWDER, Amber, or Pulvis e succino, is a form of medicine prescribed in the late London pharmacopeia, in the room of the troches of amber, or *trochisci de carabe* of former dispensaries. The composition of the powder is this: take prepared amber and gum arabic, of each ten drachms; juice of hypocistis, balauftines, and Japan earth, of each five drachms; olibanum, half an ounce; strained opium, a drachm; mix all these together into a fine powder. Pemberton's Lond. Disp. Amber, though formerly much esteemed as a medicine, is now only used in pharmacy, for obtaining the oil and acid which it yields by distillation.

POWDER, Antimonial. See ANTIMONY and JAMES'S Powder.

POWDER, Aromatic, of the Edinb. Ph., is prepared by rubbing equal parts of cinnamon bark, cardamom seeds, and ginger-root to a very fine powder, which is preserved in a well-stopped phial. That of the Dub. Ph. by rubbing together an ounce of cinnamon bark, and lesser car-

damom seeds freed from the husks, ginger and long pepper, of each an ounce, to a powder. These combinations of aromatics are stimulant and carminative, and may be used to promote digestion and expel flatus in cold phlegmatic habits; but they are more generally employed to give warmth to other compositions. The dose is from grs. viij to ℥j, given in the form of bolus, or distilled in water.

POWDER, Aromatic Purging, is formed by pounding and well mixing the best Turkey rhubarb, cinnamon, and fine sugar, of each two drachms. Where flatulency is accompanied with costiveness, a tea-spoonful of this powder may be taken once or twice a-day, according to circumstances. Buchan.

POWDER of Asarabacca, Compound, is prepared, according to the Edinb. Ph., by rubbing three parts of the leaves of asarabacca and one part of the leaves of marjoram, and the same of those of lavender, together to a powder. The Dublin college directs one ounce of dried leaves of asarabacca and two drachms of lavender flowers dried together to a powder. A few grains of this powder snuffed up the nostrils for several successive evenings at bed-time, excite sneezing and a copious discharge of mucus, which continues to flow on the succeeding days. It has been particularly used in tooth-ache and chronic ophthalmia. See ASARUM.

POWDER, Astringent, is formed by pounding together alum and Japan earth, of each two drachms. If the whole be divided into ten or twelve doses, one of them may be taken every hour in an immoderate flow of the menses, and other hæmorrhages, or every half hour, if the hæmorrhage be violent.

POWDER of Bole is formed by pulverizing the following ingredients, viz. bole armenic, or French bole, two ounces; cinnamon, one ounce; tormentil root, and gum arabic, of each six drachms; and long pepper, one drachm. This warm, glutinous, astringent powder, is given in fluxes, and other disorders, where medicines of that class are necessary, in the dose of a scruple, or half a drachm. A powder of this kind is prescribed in the late London pharmacopeia, instead of the confectio Fracastorii, or diafcardium. If a drachm of opium be added, it will make the powder of bole with opium, which may be taken in the same quantity as the former, but not above twice or thrice a-day. Buchan. See *Compound POWDER of Chalk*, infra.

POWDER, Bezoardic, the name given in the late London Dispensatory to the powder, commonly called Gascoign's powder. This is now ordered to be made only of crab's claws, one pound; prepared pearls and red coral, of each three ounces; and oriental bezoar, an ounce. The amber and hartshorn are left out of the composition, as improper inefficacious ingredients; and the whole ordered to be kept also without the bezoar, and called by the name of *pulvis e chelis canrocom compositus*, the name by which Gascoign's powder used to be known.

POWDER of Carbonate of Lime, Compound, formerly *Cre-taceous powder*, is prepared by the directions of the Edinb. Ph. by rubbing together four ounces of prepared carbonate of lime, one drachm and a half of cinnamon bark, and half a drachm of nutmegs to a powder. See *Compound POWDER of Chalk*, infra.

POWDER, Carminative, is made by reducing half an ounce of coriander seed, one drachm of ginger, half a drachm of nutmegs, and a drachm and a half of fine sugar into a powder; which quantity will be sufficient for twelve doses. It is employed for expelling flatulencies arising from indigestion, particularly those to which hysteric and hypochondriac persons are so liable. It may be likewise given in small

quantities to children in their food, when troubled with gripes.

POWDER, Carthusian. See ANTIMONY, and KERMES Mineral.

POWDER of Cassius. See CASSIUS'S Purple Powder, and GOLD.

POWDER, Cerusse, Pulvis e cerussa, a medicine prescribed in the late London pharmacopœia, in the place of the white troches of Rhazes or Razi. The late compositions of that medicine had been much more complex than the original receipt of that author, and the college have therefore retrenched the number of ingredients in them; and as the medicine is always to be powdered for use, it is now ordered to be kept in the form of powder. It is thus ordered to be made: take cerusse, five ounces; sarcocolla, an ounce; gum tragacanth, half an ounce; and make the whole into a fine powder. Pemberton. It is omitted in the recent dispensatories.

POWDER of Chalk, Compound, is prepared, according to the Lond. Ph. by rubbing separately half a pound of prepared chalk, four ounces of cinnamon bark, tormentil root, and acacia gum, of each three ounces, and half an ounce of long pepper, to a fine powder, and then mixing them. This preparation containing a larger proportion of aromatics than the compound powder of carbonate of lime, above mentioned, and the addition of the tormentil root, is better adapted for checking diarrhœa connected with acidity of the primæ viæ, than that of Edinburgh, which is a simple but grateful antacid. The dose is from grs. v to ℥j, given in the form of mixture rubbed up with mucilage and distilled water.

POWDER of Chalk with Opium, Compound, of the L. P. is prepared by mixing six ounces and a half of compound powder of chalk, with four scruples of hard opium powdered. The addition of opium renders it more proper for diarrhœa than the former, and as the quantity of opium is small, one grain only being contained in two scruples of the powder, this is an useful opiate powder for children, when afflicted with the irritative diarrhœa of teething. The dose is from ℥j to ʒj for adults.

POWDER of Cinnamon, Compound, is prepared, according to the L. P. by rubbing together two ounces of cinnamon bark, one ounce and a half of cardamom seeds, one ounce of ginger-root, and half an ounce of long pepper, to a very fine powder. See Aromatic POWDER, supra.

POWDER of Contrayerva, Compound, is prepared by mixing five ounces of contrayerva root powdered with a pound and a half of prepared shells. (See CONTRAYERVA.) This powder is stimulant and sudorific; and is given with advantage in typhoid fevers, the malignant exanthemata, the sinking stage of dysentery; and in atonic gout. The dose is from grs. x to grs. xl, given either diffused in simple water, or rubbed up with mucilage and mint water.

POWDER, Cornachine. See CORNACHINE.

POWDER, Diuretic, is made by pounding together four ounces of gum arabic, and one ounce of purified nitre. If the whole be divided into twenty-four doses, one may be taken three times a-day, with considerable benefit, during the first stage of the venereal disease. Buchan.

POWDER, Emetic. See EMETIC, and POWDER of Ipecacuanha.

POWDER, Gascoign's. See GASCOIGN, and Bezuardic POWDER.

POWDERS, Gout, by Dr. Dover, and lord Portland. See DOVER'S Powder, GOUT, and POWDER of Ipecacuanha and Opium, infra.

POWDER, or Pulvis Guttetæ. See GUTTETÆ Pulvis.

POWDER of burnt Hartshorn, Pulvis cornu cervini usti, is formed, according to the D. P., by burning pieces of hartshorn until they become white, and then reducing them to fine powder.

POWDER of burnt Hartshorn with Opium, is prepared, according to the L. P., by mixing a drachm of hard opium powdered; an ounce of hartshorn burnt and prepared; and an ounce of cochineal powder. See Hart's-HORN.

POWDER, Opiate, of E. P., is formed by rubbing together, to a fine powder, one part of opium, and nine parts of prepared carbonate of lime. Ten grains of either of these powders contain one grain of opium, and they are intended for exhibiting opium in very small doses. The substances that are used for dividing the opium, are of no consequence as to the effect of the remedy; and, therefore, the burnt hartshorn being more brittle than the chalk, is better fitted for this purpose.

POWDER, Jesuits'. See CINCHONA.

POWDER of Jalap is prepared, according to the E. P., by rubbing together, to a fine powder, one part of jalap root with two parts of supertartrate of potash. The supertartrate serves not only to divide the jalap very minutely, but to modify its purgative operation. This powder is an useful purgative in habitual costiveness: it is also very useful to children with tumid belly, in worm cases, and in dropsy. The dose is from ℥j to ℥ij for adults. See JALAP.

POWDER of Ipecacuanha, Compound, is prepared, according to the L. and D. P., by mixing ipecacuanha root powdered, and hard opium powdered, of each a drachm, with an ounce of powdered sulphate of potash.

POWDER of Ipecacuanha and Opium, formerly DOVER'S powder, (which see,) is directed by the Edinb. college to be prepared by rubbing together into a fine powder ipecacuanha root powdered and opium, of each one part, with eight parts of sulphate of potash. This powder operates as a powerful sudorific, and is often given, with this intention, in acute rheumatism, gout, dropsy, dysentery, and in all cases, whether inflammatory or not, where profuse sweating is required. The dose is from grs. v to ℥j, given diffused in water, or in the form of bolus, and assisted with plentiful dilution of tepid fluids, drank some time after taking the powder, lest it should be rejected from the stomach. Ten grains of this powder contain one grain of opium. See DOVER'S Powder.

POWDER of Kino, Compound, is formed, according to the L. P., by rubbing separately into a fine powder, 15 drachms of kino, half an ounce of cinnamon bark, and one drachm of hard opium, and then mixing them. This is an astringent powder, now first introduced into the pharmacopœia; the proportion of opium it contains is 1 in 20: the dose is from grs. x to ℥j.

POWDER of Myrrh, a form of medicine prescribed in the late London Dispensatory, to supply the place of the troches of myrrh. It is ordered to be made thus: take of dried leaves of rue, of dittany of Crete, of myrrh, each an ounce and a half; of assa-fœtida, sagapenum, Ruffia castor, and opopanax, each an ounce; and beat altogether to a fine powder. Pemberton.

POWDER, Saline Laxative, is prepared of soluble tartar and cream of tartar, of each one drachm, and of purified nitre, half a drachm. In fevers, and other inflammatory disorders, where it is necessary to keep the body gently open, one of these cooling laxative powders may be taken in a little gruel, and repeated occasionally. Buchan.

POWDER of Scammony, Compound, is prepared, according to the L. P., by reducing separately into a fine powder scammony

scammony gum-resin, and hard extract of jalap, of each two ounces; and ginger-root, half an ounce; and then mixing them. This powder differs materially from the "pulvis é scammonio compositus of P. L. 1745," which was then intended to supply the place of the earl of Warwick's powder, and consisted of a mixture of four parts of scammony, and three of burnt hartshorn. In the E. P. it is directed to be prepared by rubbing together, to a very fine powder, equal parts of scammony and supertartrate of potash. These two powders of the L. and E. P. differ very materially in their nature and effect, though they bear the same name. In the first, the activity of the scammony is aided by the jalap, as its griping effect is in some degree mitigated by the ginger. In the second, the supertartrate of potash renders the operation of the scammony less violent and less irritating, and yet more certain. The dose of the first is from grs. x to grs. xv; that of the second from grs. x to ʒiʒ. They are chiefly used in hydropic and worm cases, and to remove mucous obstructions.

POWDER of Squill is directed by the D. P. to be prepared by first drying squill roots (bulbs), freed from their membranous integuments, and cut in transverse slices, upon a sieve with a low degree of heat, and then reducing it to powder, which must be preserved in well-stopped glass phials.

POWDER of Senna, Compound, of the L. P., is to be prepared by reducing to fine powder half an ounce of scammony gum-resin separately, and the other ingredients, viz. senna leaves and supertartrate of potash, of each two ounces, and of ginger-root two drachms, together; and then mixing them. This powder is hydragogue and cathartic; but the bulk of the dose, though it weighs only from ʒj to ʒj, renders it inconvenient for use.

POWDER of burnt Sponge, is prepared, according to the D. P., by cutting a sponge in small pieces, and beating them so as to free it from little stones; then burning it in a covered iron vessel, until it become black and friable, and finally reducing it to powder.

POWDER, Steel, is made by pounding together filings of steel and loaf sugar, of each two ounces, and half an ounce of ginger. In obstructions of the menses, and other cases where steel is proper, a tea-spoonful of this powder may be taken twice a-day. Buchan.

POWDER, Styptic. See STYPTIC.

POWDER, Suffolk. See SUFFOLK Powder.

POWDER of Sulphate of Alum, Compound, formerly called "Styptic powder," is prepared, according to the E. P., by rubbing together, to a fine powder, four parts of sulphate of alum, and one part of kino. This is a powerful astringent, and is sometimes used internally in menorrhagia and diarrhoea; but it is more generally employed as an external application. The dose is from grs. x to grs. xv, to be taken in a dry state, because the kino is decomposed by the alum, when a fluid vehicle is employed.

POWDER, Sympathetic. See SYMPATHETIC.

POWDER of Tragacanth, Compound, is formed, according to the L. P., in the following manner: take of tragacanth powdered, acacia gum powdered, and starch, of each an ounce and a half, and three ounces of refined sugar. Powder the starch and sugar together; then add the tragacanth and acacia gum, and mix the whole. The tragacanth is not reducible to powder without great difficulty. Ten grains of this compound render a bulk of two fluid-ounces of liquid as thick as it can be conveniently taken. The starch, which is insoluble in cold water, might be omitted. This powder is efficaciously used as a demulcent in hectic fever,

and to allay the tickling cough of catarrh; in gonorrhœa and strangury, it is given, combined with nitre, and in dysentery, with ipecacuanha powder. The dose is from ʒiʒ to ʒiij, mixed in water, or any bland fluid.

POWDERS, Worm, are formed by well mixing of tin, reduced into a fine powder, an ounce, and of Æthiops mineral, two drachms. Let the whole be divided into six doses; and one of them may be taken in a little syrup, honey, or treacle, twice a-day. After they have been all used, the following anthelmintic purge will be proper.

POWDER, Purging Worm, is prepared of powdered rhubarb, a scruple; and of scammony and calomel, of each five grains. Rub these together in a mortar for a dose. For children the above doses must be lessened, according to their age. If the powder of tin be given alone, its dose may be considerably increased. Dr. Alston gave it to the amount of two ounces in three days, and says, when thus administered, that it proved an excellent anthelmintic. He used to purge his patients both before they took the powder, and afterwards.

POWDER of Yellow Bladder-wrack, Pulvis quercus marinæ, is directed by the D. P. to be formed in the following manner: take of bladder-wrack, in flower, any quantity: let it be dried, and freed from the fordes, then exposed to heat in an iron vessel, or a crucible, to which is adapted a perforated lid, until the vapour ceasing, it becomes obscurely red-hot: reduce the carbonaceous matter which remains to powder. This powder is a mixture of soda and charcoal. The burnt substance is considered as deobstruent, and has been exhibited in scrophulous affections, and bronchocele; and Dr. Russell found the mucus of the vesicles an excellent resolvent when externally applied to scrophulous swellings.

POWDER for the Hair, is flour of wheat, or beans, well sifted and prepared, to give it an agreeable odour.

That in which starch-grounds are mixed is much used. See STARCH.

POWDER, Fulminating. See Pulvis FULMINANS.

POWDER, Gun. See GUNPOWDER.

POWDER-Cart, in Artillery, a two-wheel carriage, covered with an angular roof of boards; and to prevent the powder from being damp, a tarred canvas is put over the roof. On each side are lockers to hold shot, in proportion to the quantity of powder, which is generally four barrels.

POWDER-Chests, in the Sea Language, are small boxes filled with gunpowder, pebbles, old nails, or splinters of iron, fastened occasionally on the decks and sides of a ship, which they set fire to, when the ship is boarded by an enemy, and soon make all clear before them. These cases are usually from twelve to eighteen inches in length, and about eight or ten in breadth, having their outer, or upper part, terminating in an edge. They are nailed to several places of the quarter, the quarter-deck, and bulk-head of the waist, having a train of powder, which communicates with the inner apartment of the ship, so as to be fixed at pleasure to annoy the enemy. Falconer.

POWDER-Flasks, in Artillery, are most commonly made of horn, of any convenient size and figure, to carry powder for priming of cannon: this is their chief use in armies.

Sometimes they are so made as to have a measure for the charge of the piece at top, but this is of more use to gentlemen in fowling, &c. than to soldiers, who have the charges of their piece put into cartridges, which they bite off, and first prime, and then load.

POWDER-Magazine. See MAGAZINE.

POWDER-Mill. See MILL, and GUNPOWDER.

POWDER-Room, in a *Ship*, that part of the hold in which the powder is stowed. See **MAGAZINE**.

POWDER of Projection. See **PROJECTION**.

POWDER-Triers, in *Artillery*. See **GUNPOWDER**.

POWDERS, Flux. See **FLUX**.

POWDERINGS, in *Building*, a term sometimes used for devices serving to fill up vacant spaces, in carved works; as also in escutcheons, writings, &c.

POWDERINGS, in *Heraldry*. See **FURR**.

POWEL'S CREEK, in *Geography*, a river of America, in the state of Tennessee, which rises in Powel's mountain, runs S.W., and enters Clinch river, through its N. bank, 38 miles N.E. of Knoxville: it is said to be navigable in boats 100 miles. America has also other creeks of the same name; one in Virginia, which runs into James river, N. lat. $37^{\circ} 13'$. W. long. $77^{\circ} 21'$; and another in Pennsylvania, which runs into the Susquehannah, N. lat. $40^{\circ} 23'$. W. long. $77^{\circ} 1'$.

POWEL'S Key, a small island among the Bahamas. N. lat. $26^{\circ} 49'$. W. long. $77^{\circ} 30'$.

POWEL'S Point, a cape on the coast of North Carolina, at the entrance into Albemarle sound. N. lat. $36^{\circ} 1'$. W. long. $76^{\circ} 4'$.—Also, a cape of Virginia, in James river. N. lat. $37^{\circ} 2'$. W. long. $76^{\circ} 24'$.

POWEL'S Valley, a district of America, which lies between Powel and Cumberland mountains, between 80 and 90 miles in length, and from 10 to 18 wide, and which is almost equally divided between Virginia and Tennessee. The soil is easily cultivated, some parts of it being of the best quality. The water is good and plentiful, and the air is salubrious. It produces grain, corn, grafs, flax, hemp, fruit-trees, &c. and the Tennessee part yields cotton. It is furnished with good stone quarries, and good timber for building, and has a good outlet for boats by means of Powel's river, which is well stocked with fish. About the middle of the valley is a natural bridge, over a small creek, formed by three regular arches, 50 feet long, 40 high, and 20 wide.

POWELL, DAVID, in *Biography*, a learned antiquary, was born in Derbyshire about the year 1552, and was educated at Oxford, where he took his degree of D. D. He died in 1590, and was buried in the church of Ruabon, in Denbighshire, of which he was vicar. He published "Caradoc's History of Wales in 1584;" "Annotationes in Itinerarium Cambriæ Scrip per Giraldum;" "De Britannica Historia recte intelligenda."

POWELL, WILLIAM SAMUEL, was born at Colchester in 1717, and educated at St. John's college, Cambridge, of which he became successively fellow and master. In 1766 he obtained the archdeaconry of Colchester, and other preferments. Dr. Powell published a famous sermon on subscription to the articles, and other discourses. The doctor contended that young persons might subscribe on the authority of others; which, says Mr. Archdeacon Blackburne, might be liable to the repartée which was made to bishop Pierce, by a poor man, who was required to assent to the contents of the book of Common Prayer, at the time of the infamous Bartholomew act. The man begged first to read it; "You have already read it," replied the prelate, "by the mouth of the convocation, which is your representative."—"If that be the case," said the man, "let it suffice for me to assent to it by the mouth of the convocation." Blackburne's Works, vols. v. and vii.

POWER, LIONEL, author of one of the Tracts in the celebrated musical MS. of Waltham Holy-Cross, in Essex; which upon the suppression of the monasteries, became the property of the venerable Tallys, whose name appears in

his own hand-writing on the back of the last leaf. Morley seems to have consulted this MS., but to whom it belonged after the death of Tallys does not appear till the reign of king William, when it was among the books of Mr. Powle, speaker of the house of commons. From him it went to lord Somers; and then to sir Joseph Jekyll, at the sale of whose library by auction, it was purchased by a country organist, who in gratitude for some benefits received, presented it to the late James West, esq. president of the Royal Society, and it is now in the possession of the marquis of Lansdown. It contains nine tracts on music, seven of which are in Latin, and two in very old English. That by Lionel Power is the eighth. It is a short treatise in English, which, besides the obsolete words, orthography, and shape of the letters, has several other internal marks of considerable antiquity: such as a mixture of Saxon letters; an oblique stroke instead of a dot over the letter *i*; and the frequency and kind of abbreviations. Though this essay will afford no information of importance to a musician of the present times, except that which will gratify self-complacence, by discovering to him that the author knew less than subsequent improvements in the art of music have enabled him to know himself; yet, as it seems to be the most ancient musical tract that has been written, or at least preserved, in our vernacular tongue, we shall give a quotation from it, not only to shew the state of our music, but our language at the time it was written, which was, probably, during the reign of Edward III.

"This tretis is contynued upon the gamme for hem that wil be syngers, or makers, or techers. For the ferst thing of alle ye must kno how many cordis of discant ther be. As olde men sayen, and as men syng now-a-dayes, ther be nine; but whofo wil syng mannerli and musikeli, he may not lepe to the fyfteenth in no maner of discant; for it longeth to no manny's uoys, and so ther be but eyght accordis after the discant now usid. And whofoever wil be a maker, he may use no mo than eyght, and so ther be but eyght fro unison unto the thyrteenth. But for the quatribil syghte ther be nine accordis of discant, the unison, thyrd, fyfth, sixth, eyghth, tenth, twelfth, thyrteenth, and fyfteenth, of the whech nyne accordis fyve be perfyte and fower be imperfyte. The fyve perfyte be the unison, fyfth, eyghth, twelfth, and fyfteenth; the fower imperfyte be the thyrd, sixth, tenth, and thyrteenth: also thou maist ascende and descende wyth alle maner of cordis excepte two accordis perfyte of one kynde, as two unisons, two fyfths, two eyghths, two twelfths, two fyfteenths, wyth none of these thou maist neyther ascende, neyther descende; but thou must confette these accordis togedir, and medele hem wel, as I shall enform the. Ferst thou shall medele with a thyrd a fyfth, wyth a sixth an eyghth, wyth an eyghth a tenth, wyth a tenth a twelfth, wyth a thyrteenth a fyfteenth; under the whech nyne accordis three syghtis be conteynyd, the mene syght, the trebil syght, and the quatribil syght: and others also of the nyne accordis how thou shalt hem ymagine betwene the playn-song and the discant here folloeth the ensample. First to enforme a chylde in hys counterpoynt, he must ymagine hys unison the eygth note fro the playn-song, benethe hys thyrd; the sixth note benethe hys fyfth; the fowerth benethe his sixth; the thyrd note benethe his eyghth, even wyth the playne song; hys tenth and thyrd note aboue, his twelfth the fyfth note aboue, his thyrteenth the sixth aboue, hys fyfteenth the eyghth note aboue the playne-song."

POWER, Potentia, in *Physics*, a natural faculty of doing or suffering any thing. Accordingly, Mr. Locke explains the origin of our idea of power to the following effect: the mind

mind being daily informed, by the senses, of the alterations of the simple ideas of things without, and reflecting on what passes within itself, and observing a constant change of its ideas, sometimes by the impressions of outward objects upon the senses, and sometimes by the determinations of its own choice; and concluding, from what it has so constantly observed to have been, that the like changes will for the future be made in the same things, by the same agents, and by the like ways; considers, in one thing the possibility of having any of its simple ideas changed; and in another, the possibility of making that change; and so comes by that idea which we call *power*. Thus we say, fire has a power to melt gold, and make it fluid; and gold has a power to be melted.

Power, thus considered, is twofold; *viz.* as able to *make*, or able to *receive*, any change; the one may be called *active*, the other *passive* power.

Of *passive* power, all sensible things abundantly furnish us with ideas; nor have we of *active* power fewer instances; since whatever change is observed, the mind must suppose a power somewhere able to make that change.

Yet, if we attentively consider it, bodies, by our senses, do not afford us so clear and distinct an idea of active power, as we have from reflection on the operations of our minds; for all power relating to action, and there being but two sorts of action, *viz.* thinking and motion, it may be considered whence we have the clearest ideas of the powers which produce those actions.

Of thinking, body affords us no idea at all; it is only from reflection that we have that: neither have we from body any idea of the beginning of motion. A body, at rest, affords us no idea of any active power to move; and when it is set in motion itself, that motion is rather a passion than an action in it. The idea of the beginning of motion, we have only by reflection on what passes in ourselves; where we find by experience, that, barely by willing it, we can move the parts of our bodies, which before were at rest.

We find in ourselves a power to begin or forbear, continue or end, several actions of our minds and motions of our bodies, barely by a thought or preference of the mind. This power which the mind has, thus to order the consideration of any idea, or the forbearing to consider it, or to prefer the motion of any part of the body to its rest, and *vice versa*, in any particular instance, is what we call the *will*. And the actual exercise of that power, is that which we call *volition*, or *willing*.

The forbearance or performance of that action, consequent to such an order or command of the mind, is called *voluntary*; and whatsoever action is performed without such a thought of the mind, is called *involuntary*.

The power of perception, is what we call the *understanding*.

Perception, which we make the act of understanding, is of three sorts: the perception of ideas in our minds; the perception of the signification of signs; and the perception of the agreement or disagreement of any distinct ideas.

These *powers of the mind*, *viz.* those of perceiving, and preferring, are usually called by another name; and the ordinary way of speaking is, that the *understanding* and *will* are two faculties or powers of the mind. A word proper enough, if used so as not to breed any confusion in men's thoughts, by being supposed, as there is room to suspect it has been, to express some real beings in the soul, that perform those actions of understanding and volition.

From the consideration of the extent of the power of the mind over the actions of the man, which every one finds in himself, arise the ideas of liberty and necessity.

Such is Mr. Locke's account of the nature and operation of power; and of the manner by which we acquire the idea of it. To this account of its origin, Dr. Reid has suggested several objections. First of all he does not approve of his distinction of power into *active* and *passive*, as he conceives passive power to be no power at all; and therefore, by applying this term to the possibility of being changed, it is used in a sense that is altogether improper and unwarrantable; inasmuch that passive power is a contradiction in terms. Mr. Locke himself acknowledges that active power is more properly called power; and he seems to have been unwarily led to the adoption of the epithet passive by way of opposition to active power; whereas Dr. Reid thinks that certain powers are denominated active in order to distinguish them from those that are called speculative. Our author also is of opinion, that Mr. Locke has imposed upon himself in attempting to reconcile his account of the idea of power to his favourite doctrine, that all our simple ideas are ideas of sensation, or of reflection. The co-operation of other powers of the mind, besides sensation and reflection, is necessary to our forming an idea of power by the process which Mr. Locke has stated. Whilst we observe the present state of things by means of our senses, memory must aid us in the review of those that are past; and it is by such a review that we are able to judge of the change that has taken place, upon which change, thus ascertained to us, our idea of power, according to Mr. Locke's principle, depends. The same observations are applicable to consciousness, by which we determine the change that has occurred in our thoughts. The second part of the process, by which we infer from the changes that are observed the power that produces them, requires the assistance of reasoning, which is the province neither of the senses nor of consciousness. Thus in attempting to derive the idea of power from the two sources of sensation and reflection, Mr. Locke has introduced our memory, and our reasoning faculty, for a share in its origin. Mr. Hume, whilst he professedly adopts Mr. Locke's general principle, that all our simple ideas are derived either from sensation or reflection, boldly affirms that we never have any idea of power, and that we deceive ourselves when we imagine we are possessed of any idea of this kind. He allows, however, that Mr. Locke's opinion of the origin of our idea of power is a popular opinion, and indeed the opinion, that things cannot begin to exist, nor undergo any change, without a cause that hath power to produce that change, is so popular, that few persons have presumed to dispute it. But whether this opinion be true or false, its having prevailed so generally affords a convincing proof, that men have an idea of power, in what way soever it has been acquired. In opposition to Mr. Locke's account of the idea of power, Mr. Hume advances two principles, which he considers as very obvious; one is, that reason alone can never give rise to any original idea; and the other is, that reason, as distinguished from experience, can never make us conclude, that a cause, or productive quality, is absolutely requisite to every beginning of existence. The first of these principles, so far from being obviously true, is obviously false; for we may ask, whence proceed our ideas of reasoning itself, and of all its various modes, but from our reasoning faculty? As for the second principle, nothing can be more certain, than that every change in nature must have a cause, and it is no less undeniable that this maxim is not deduced merely from experience. But this subject has

been already discussed, as far as our limits will allow, under the article CAUSE.

Power, as others have defined it, is that quality or attribute of any being which produces change in the nature, properties, or circumstances of things. Thus we say, clay becomes hard and wax soft by the power of heat; a bee is said to have power to build a cell, a bird to make a nest, and a man to construct a ship or house, &c. But a question here occurs, whether beings that have no will or understanding may have active power? In the solution of this question, we can derive little satisfaction from the consideration of the events that are observed in the course of nature. We perceive innumerable changes, and we know that these changes must be produced by the active power of some agent; but we neither perceive the agents nor the power, but merely the change. Whether the things be active, or merely passive, is not easily discovered; and indeed it concerns us little to know the real efficient, whether it be matter or mind, whether of a superior or inferior order.

According to Mr. Locke, the only clear notion or idea we have of active power is deduced from the power which we find in ourselves to give certain motions to our bodies, or a certain direction to our thoughts; and this power in ourselves can be brought into action only by willing or volition. Hence it must follow, that if we had not will, and that degree of understanding which will necessarily implies, we could exert no active power, and consequently could have none; for power that cannot be exerted is no power; and it follows also, that the active power, of which only we can have any distinct conception, can be only in beings that have understanding and will.

Upon the whole, Dr. Reid thinks it most probable, that such beings only as have some degree of understanding and will, can possess active powers; and that inanimate beings must be merely passive, and have no real activity. Nothing we perceive without us affords any good ground for ascribing active power to any inanimate being; and every thing we can discover in our own constitution leads us to think that active power cannot be exerted without will and intelligence. But if we restrict active power to a subject endowed with will and intelligence, what shall we say of the powers, ascribed by philosophers to matter:—the powers of corporeal attraction, magnetism, electricity, gravitation, and others? In reply to this inquiry, it should be considered, that the ambiguity of the words *cause*, *agency*, *active power*, &c. has led many to understand them, when used in natural philosophy, in a wrong sense, and in a sense which is neither necessary for establishing the true principles of natural philosophy, nor was ever meant by the most enlightened in that science. When philosophers attribute active powers to matter, they teach us, at the same time, that matter is a substance altogether inert and merely passive, and that gravitation, attraction, and repulsion, &c. which they ascribe to it, are not inherent in its nature, but impressed upon it by some external cause, which they do not pretend to know, or to be able to explain. Although on some occasions philosophers speak the language of the vulgar, they think differently from the vulgar, and in order to avoid affectation and ostentation, and to render themselves intelligible, they condescend to use the common phraseology. The word power, therefore, when applied to inanimate substances, like the term principle, &c., is a term invented to express the unknown cause of known effects which are reducible to certain laws. It is difficult to ascertain, says an ingenious writer, whether powers are, properly speaking, attributes

of inanimate substances. To allow that they are seems to imply, that power may exist without an agent, and that beings may act where they do not exist. This absurdity follows, if, *e. g.* gravitation is supposed to be a power inherent in matter, by which bodies act upon each other at immense distances. But, on the contrary, to deny, that powers may be attributes of inanimate substances, leads to the conclusion, that nothing exists in the universe but God and his energies, which coincides with pantheism, and even tends to atheism.

In all languages, action is attributed to many things that are known and allowed to be merely passive; as when we say, the wind blows, the rivers flow, the sea rages, &c. &c. Every body which undergoes any change, must in that change be either active or passive; and the change is always expressed in language, either by an active or a passive verb; nor is there any verb, expressing a change, which does not imply either action or passion. The thing either changes, or it is changed. But in language, when an external cause of the change is not obvious, the change is always imputed to the thing changed, as if it were animated, and had active power to produce the change in itself. So we say, the moon changes, the sun rises and goes down. Thus active verbs, as Dr. Reid has observed, in illustrating the observation at large, are very often applied, and active power imputed to things, which a little advance in knowledge and experience teaches us to be merely passive. To sum up this part of the argument: we see in the theatre of nature innumerable effects, which require an agent endued with active power, but the agent is behind the scene. Whether he be the supreme cause alone, or a subordinate cause or causes; and if subordinate causes be employed by the Almighty, what their nature, their number, their different offices may be, are things hid, for wise reasons without doubt, from the human eye. It is only in human actions, that may be inspected for praise or blame, that it is necessary for us to know who is the agent, and in this, nature has given us all the light that is necessary for our conduct. Every man is conscious of a power to determine, in things which he conceives to depend upon his determination. This observation leads us to consider power, in a more peculiar and distinguishing sense, an attribute of mind; whether we allow it to belong to inanimate substances or not. To the negative in this question we feel ourselves much inclined, as the least objectionable, though it is not without its difficulties. As an attribute of mind, power may be defined the power of carrying into effect the determinations of the will. Those who maintain that power is an attribute of the human mind, argue, 1. From consciousness and observation. I will to walk, to speak, to write; the bodily organs instantly obey; and I am as conscious that I perform the action, as that I form the volition. Other agents possess a similar power. 2. It is affirmed, that we have a conception of power, though we cannot satisfactorily define it. Those who deny that power is an attribute of the mind, contend 1. That we have no consciousness of its existence. We are merely conscious, they say, of volition and the effect produced: that which some call a consciousness of power being nothing more than a belief that the effect will follow the volition. 2. They further argue, that our total ignorance of the manner in which muscular motion is produced, proves that the mind is not the efficient and proper cause of this wonderful effect. Locke's Essay on the Human Understanding. Reid's Essays. Stewart's Elements. Belsham's Elements. See CAUSE, LIBERTY, NECESSITY, *Mental Philosophy*, UNDERSTANDING, VOLITION, VOLUNTARY, WILL.

POWER.

POWER, in *Arithmetic*, the product of a number, or other quantity multiplied into itself.

Thus the product of the number 3, multiplied by itself, *viz.* 9, is the second power of 3; the factum of 9, multiplied by three, *viz.* 27, is the third power; and the product of 27, again multiplied by 3, *viz.* 81, is the fourth power; and so on to infinity. In respect of these higher powers, the first number, 3, is called the *root*, or first power.

The second power is called the *square*; with respect to which, 3 is the square root.

The third power, 27, is called the *cube*; with respect to which, 3 is the cube root.

The fourth power, 81, is called the *biquadrate*, or *quadrato-quadratum*; with respect to which, 3 is the biquadratic root.

The number which shews how often the root is multiplied into itself, to form the power, or how oft the power is to be divided by its root, to come at the root, is called the *exponent* or *index of the power*.

The moderns, after Des Cartes, are contented to distinguish most of their powers by the exponents; as *first, second, third, &c.*

The particular names of the several powers were introduced by the Arabs, *viz.* *square, cube, quadrato-quadratum* or *biquadrate, surdesolid, square of the cube, second surdesolid, quadrato-quadrato-quadratum, cube of the cube, square of the surdesolid, third surdesolid, &c.*

The names given by Diophantus, followed by Vieta and Oughtred, are the *side* or *root, square, cube, quadrato-quadratum, quadrato-cubus, cubo-cubus, quadrato-quadrato-cubus, quadrato-cubo-cubus, cubo-cubo-cubus, &c.*

The characters with which the several powers are denoted both in the Arabic and Cartesian notation, are as follow:

	2	4	8	16	32	64	128	256	512	1024
Arab. R	q	c	bq	s	qc	Bf	tq	bc	fq	
Cartes. a	a ²	a ³	a ⁴	a ⁵	a ⁶	a ⁷	a ⁸	a ⁹	a ¹⁰	

Hence to raise a quantity to a given power or dignity, is the same as to find the factum arising upon its being multiplied a given number of times into itself; *e. gr.* to raise 2 to the 3d power, is the same as to find the factum 8; whose factors are 2, 2, 2. This operation is called *involution*; which see.

Powers of the same degree are to one another, in the ratio of the roots, as manifold as their exponent contains units: thus, squares are in a duplicate ratio; cubes in a triplicate ratio; quadrato-quadrata, or fourth powers, in a quadruplicate ratio. See **RATIO**.

The powers of proportional quantities are also proportional to one another.

POWER, *Arithmetical*, is used by Mr. Machin for composite numbers or quantities, whose factors are in arithmetical progression. See Dr. Martin's *Abridg. Phil. Transf.* vol. viii. p. 78.

Mr. Machin uses a particular notation for quantities of this kind. The quantity expressed by this notation has a double index; that at the head of the root at the right hand, but separated by a hook to distinguish it from the common index, denotes the number of factors; and that above, within the hook on the left hand, denotes the common difference of the factors proceeding in a decreasing or increasing arithmetical progression.

$$\overbrace{a}^{(m)}$$

Thus the quantity $n + a$ denotes by its index m on the right hand, that it is a composite quantity, consisting of so many factors as there are units in the number m , and the index a above on the left, denotes the common difference of the factors decreasing in an arithmetical progression, if it be positive: or increasing, if it be negative; and so signifies, in the common notation, the common number or quantity, $n + a, n + a - a, n + a - 2a, \&c.$

$$\overbrace{2}^{(6)}$$

For example, $n + 5$ is $n + 5, n + 3, n + 1, n - 1, n - 3, n - 5$, consisting of six factors, whose common difference is 2. After the same manner, $n + 4$, ($5 = n + 4, n + 2, n, n - 2, n - 4$), consisting of five factors. According to which method, it will easily appear, that if a be an integer,

$$\overbrace{2}^{(2a + 2, \&c.)}$$

then $n + 2a + 1$ will be $nn - 1, nn - 9, nn - 25$, continued to such a number of double factors as are expressed by $a + 1$, or half the index, which in this

$$\overbrace{2}^{(2a + 1)}$$

case is an even number. Thus also $n + 2a$ will be equal to $n, nn - 4, nn - 16, nn - 36$, and so on, where there are to be so many double factors, as with one single one n , will make up the index $2a + 1$, which is an odd number.

If the common difference a be an unit, it is omitted: thus $\overbrace{6}^{(6)} = n, n - 1, n - 2, n - 3, n - 4, n - 5$, containing six factors. So $\overbrace{6}^{(6)} = 6, 5, 4, 3, 2, 1$, and the like for others.

If the common difference a be nothing, the hook is omitted, and it becomes the same with the geometrical

$$\overbrace{a}^{(m)}$$

power. Thus $n + a = n + a^m$, according to the common notation.

The learned author above quoted applies this doctrine of arithmetical powers to the investigation of the principal rule in the method of fluxions, and its inverse, which is that if the ordinate $y = m z^{m-1}$, then will the area, or rather the form of the quantity for the area, be $= z^m$; or *vice versa*, that if the area be z^m , the ordinate will be $m z^{m-1}$; on which occasion he observes, that the symbol z , considered as a component part of the rectangle z , may bear a plain interpretation, *viz.* that it is the measure according to which the quantity z is measured. See **FLUXION**.

From a given power to extract the root, or *side*, is the same as to find a number, *e. gr.* 2, which multiplied any number of times, *e. gr.* twice, produces the given power, *e. gr.* the 3d power, or 8. This operation is called **EVOLUTION**, and **EXTRACTION of Roots**; which see.

To multiply or divide any power by another of the same root. 1. For multiplication, add the exponents of the factors; the sum is the exponent of the factum. Thus:

Factors	$\left\{ \begin{array}{l} x^i \\ x^i \end{array} \right.$	$\left\{ \begin{array}{l} y^n \\ y^m \end{array} \right.$	$\left\{ \begin{array}{l} y^m \\ y^n \end{array} \right.$	$\left\{ \begin{array}{l} a^m \\ a^r \end{array} \right.$	$\left\{ \begin{array}{l} x^n \\ x^i \end{array} \right.$
Prod.	x^7	y^{2n}	y^{n+n}	a^{m+r}	x^{n+i}

2. For division, subtract the exponent of the power of the divisor, from the exponent of the dividend; the remainder is the exponent of the quotient. Thus:

$$\begin{array}{l} \text{Divid. } x^7 \left(x^3 \parallel y^{m+n} \left(y^m \parallel a^m \left(a^{m-r} \parallel x^n \left(x^{n-r} \right. \right. \right. \right. \\ \text{Divif. } x^3 \left(\parallel y^n \left(\parallel a^r \left(\parallel x^r \left(\right. \right. \right. \right. \end{array}$$

M. de la Hire gives us a very odd property common to all powers: M. Carre had observed with regard to the number 6, that all the natural cubic numbers, 8, 27, 64, 125, whose root is less than 6, being divided by 6, the remainder of the division is the root itself; and if we go farther, 216, the cube of 6, being divided by 6, leaves no remainder: but the divisor 6 is itself the root. Again, 343, the cube of 7, being divided by 6, leaves 1; which, added to the divisor 6, makes 7 the root, &c. M. de la Hire, on considering this, has found that all numbers, raised to any power whatever, have divisors, which have the same effect with regard thereto, that 6 has with regard to cubic numbers.

For the finding of these divisors, he discovered the following general rule:

If the exponent of the power of a number be even, *i. e.* if the number be raised to the 2d, 4th, 6th power, &c. it must be divided by 2; the remainder of the division, in case there be any, added to 2, or to a multiple of 2, gives the root of this number, corresponding to its power, *i. e.* the 2d, 6th, &c. root.

If the exponent of the power be an uneven number, *i. e.* if the number be raised to the 3d, 5th, 7th, &c. power; the double of the exponent will be the divisor, which has the property mentioned.

Thus it is found in 6, double of 3, the exponent of the power of all the cubes: thus, also, 10 is the divisor of all numbers raised to the 5th power, &c.

If any power of a quantity be divided by a greater power of the same quantity, the quotient must be negative. For the rule for dividing any power of a quantity by another power of the same, is to subtract the exponent of the divisor from the exponent of the dividend, and make the difference the exponent of the quotient.

For instance, $\frac{a^6}{a^4} = a^{6-4} = a^2$; and $\frac{a^m}{a^p} = a^{m-p}$.

Hence if p be greater than m , the exponent $m - p$ must be negative.

Thus if $p = m + n$, then $\frac{a^m}{a^p} = \frac{a^m}{a^{m+n}} = a^{-n}$.

It is obvious that $\frac{a}{a} = a^{1-1} = a^0$. But $\frac{a}{a} = 1$; and therefore $a^0 = 1$. In like manner $\frac{1}{a} = \frac{a^0}{a^1} = a^{-1}$; $\frac{1}{a^2} = \frac{a^0}{a^2} = a^{-2}$; $\frac{1}{a^3} = \frac{a^0}{a^3} = a^{-3}$, so that the

quantities $a, 1, \frac{1}{a}, \frac{1}{a^2}, \frac{1}{a^3}, \frac{1}{a^4}, \dots$ &c. may be expressed thus, $a^1, a^0, a^{-1}, a^{-2}, a^{-3}, a^{-4}, \dots$ &c.

This change of expression is often of great use in the computation of fluxions and infinite series.

When the quantity to be raised to any power is positive, all its powers must be positive. And when the radical quantity is negative, yet all its powers, whose exponents are even numbers, must be positive. For $- \times -$ gives $+$. The power then can only be negative, when the exponent is

an odd number. Thus the powers of $-a$ are $-a, +a^2, -a^3, +a^4, -a^5, \dots$ Those whose exponents are 2, 4, 6, &c. are positive; but those whose exponents are 1, 3, 5, 7, &c. are negative. Maclaur. Algebr. p. 37, 38.

Hence if a power have a negative sign, no root of it, denominated by an even number, can be assigned; since no quantity multiplied into itself an even number of times can give a negative product. Thus the square root of $-aa$ or $\sqrt{-aa}$ cannot be assigned, and is what mathematicians call an *impossible*, or an *imaginary* quantity or *root*. See Root.

Observe, that every power has as many roots, real and imaginary, as there are units in the exponent of the power. This holds true of unity itself. Maclaur. Algebr. p. 128.

POWER, *Imperfect*, in Algebra, is used for a power that has a fractional exponent; thus $a^{\frac{1}{2}}, a^{\frac{2}{3}}, a^{\frac{3}{4}}, a^{\frac{7}{8}}, \dots$ are imperfect powers. Maclaur. Algebr. p. 44.

These are otherwise expressed by placing the given power within the radical sign $\sqrt{\quad}$, and placing above the radical sign the number that denominates what kind of root is required.

Thus $a^{\frac{3}{2}} = \sqrt{a^3}$; $a^{\frac{5}{3}} = \sqrt[3]{a^5}$; $a^{\frac{m}{n}} = \sqrt[n]{a^m}$.

These imperfect powers are also called *surds*; which see.

The powers of numbers have several curious and remarkable properties, the most important of which are as follow:

1. The difference of any two equal powers of different numbers is divisible by the difference of their roots; that is,

$$\frac{x^n - y^n}{x - y} = \text{I an integer, or } x^n - y^n = \text{M}(x - y),$$

where the abridged expression $\text{M}(x - y)$ signifies an integral multiple of $x - y$.

2. The difference of the two equal powers is always divisible by the sum of their roots, when the exponent of the

power is an even number; that is, $\frac{x^{2n} - y^{2n}}{x + y} = \text{I an integer, or } x^{2n} - y^{2n} = \text{M}(x + y)$.

3. The sum of two equal odd powers of different numbers is always divisible by the sum of their roots; that is,

$$\frac{x^{2n+1} + y^{2n+1}}{x + y} = \text{I an integer, or } x^{2n+1} + y^{2n+1} = \text{M}(x + y)$$

And in all these cases it may be demonstrated, that when x and y are prime to each other, the sums, or differences of the powers as above stated, are divisible only once by their respective divisors, unless those divisors are equal to the respective powers, or to some multiple of them.

By means of the above propositions, we are also enabled to ascertain the divisors of the sum or difference of two unequal powers of the same root, *viz.*

$$(x^m - x^n) = \text{M}(x - 1), \text{ and } \text{M}(x + 1),$$

when $m - n$ is even, or of the form $2n'$; for

$$(x^m - x^n) = x^n(x^{m-n} - 1).$$

And since $m - n$ is of the form $2n'$, $(x^{m-n} - 1)$ is divisible both by $x + 1$ and $x - 1$, by prop. 1 and 2.

Again, if $m - n$ be odd, or of the form $2n' + 1$, then,

$$(x^m - x^n) = \text{M}(x - 1)$$

$$\text{And } (x^m + x^n) = \text{M}(x + 1).$$

For $x^m - x^n = x^n (x^{m-n} - 1)$
 And $x^m + x^n = x^n (x^{m-n} + 1)$.

And since by the supposition $m - n$ is odd, or of the form $2n' + 1$, it follows from prop. 1 and 3, that in the first case we have,

$$(x^{m-n} - 1) = M(x - 1)$$

And in the 2d, $(x^{m-n} + 1) = M(x + 1)$.

4. Neither the sum nor the difference of two powers, higher than the square, can produce a complete power of the same denomination; that is, $x^n \pm y^n = z^n$ is always impossible, either in integers or fractions, if x is greater than z .

This is one of Fermat's propositions mentioned by him, but without its demonstration, in the marginal notes of his edition of Diophantus. The impossibility of some partial cases have since been demonstrated by Euler, and other modern analysts: viz. it has been found impossible in the case of $n = 3$, and $n = 4$; but beyond this, the truth of the proposition rests only on the assertion of Fermat, and it would be, therefore, highly interesting to see a complete demonstration of this property. Mr. Barlow, in his Theory of Numbers, has attempted this, but failed in his conclusion, by referring to a proposition which did not apply. He has, however, made a considerable advance towards it, by proving that if there are any cases in which the equation $x^n \pm y^n = z^n$ be possible, n being a prime number, it must necessarily happen that $x - y$, $x - z$, and $y + z$, are all three complete n th powers; or two of them complete n th powers, and the other n times such a power. These limitations are sufficient to indicate the impossibility of the equation; but something farther is necessary for the complete demonstration.

5. If m be a prime number, and x any number not divisible by m , then the remainder arising from the division of x by m , will be the same as that from the division of x^m by m ; that is, $\frac{x}{m}$, and $\frac{x^m}{m}$, will both leave the same remainder.

From the above proposition is readily deduced the following, which is also another of Fermat's propositions, first demonstrated by Lagrange, viz.

6. If m be a prime number, and n any number not divisible by m , then will the formula $x^{n-1} - 1$ be divisible by m .

This is a very important proposition in the theory of numbers, being that on which depend many of the most elegant and interesting properties connected with this subject.

7. From this property we readily draw the following expressions for the forms of the different powers of numbers, and which are frequently very useful in determining *à priori* whether a proposed number be a complete power or not, without the trouble of extracting it, viz.

Since $x^{m-1} - 1$ is always divisible by m , under the limitation of the proposition; therefore, x^{m-1} is of the form $am + 1$, and consequently every power, whose exponent plus 1 is a prime number, as (m) , will be of the form am , or $am + 1$; and thus we may ascertain the forms of many of the higher powers: thus,

x^1	is of the form	$5n$, or	$5n + 1$
x^6		$7n$, or	$7n + 1$
x^{10}		$11n$, or	$11n + 1$
x^{12}		$13n$, or	$13n + 1$

Again, since m is a prime number, if it be greater than 2 it is an odd number, and consequently $m - 1$ is an even number; and therefore,

$$x^{m-1} - 1 = (x^{\frac{m-1}{2}} + 1)(x^{\frac{m-1}{2}} - 1).$$

And since this product is divisible by m , and m is a prime number, one of these factors is divisible by m , and consequently $x^{\frac{m-1}{2}}$, when divided by m , must leave either $+ 1$,

or $- 1$, for a remainder; that is, $x^{\frac{m-1}{2}}$ is of one of the forms am , or $am \pm 1$. And hence, again, we derive the forms of many other of the higher powers: thus,

x^3	is of the form	$7n$, or	$7n \pm 1$
x^5		$11n$, or	$11n \pm 1$
x^6		$13n$, or	$13n \pm 1$
x^8		$17n$, or	$17n \pm 1$
x^9		$19n$, or	$19n \pm 1$
x^{11}		$23n$, or	$23n \pm 1$
&c.		&c.	&c.

The only power under 12 excluded from these formulæ is 7, because neither $7 + 1$ nor $2 \cdot 7 + 1$ is a prime number.

8. All prime powers divided by double their exponent, will leave for remainders the same numbers as their several roots, when divided by the same double exponent. Hence we see why all 5th powers terminate with the same digit as the roots of those powers.

9. The n th differences of any consecutive n th powers is a constant quantity, and equal to the product $1, 2, 3, 4, \&c. n$.

That is, the second differences of consecutive squares = $1, 2$.

The third differences of consecutive cubes = $1, 2, 3$.

The fourth differences of consecutive 4th powers = $1, 2, 3, 4, \&c.$

This property is readily demonstrated for any particular power; but under the general index n , it is attended with some difficulty; the proof is generally made to depend upon the following property, which is not easily demonstrated, viz. that the product $1, 2, 3, 4, 5, \&c. n = n^n - n(n-1)^n + \frac{n \cdot (n-1)}{1 \cdot 2} (n-2)^n - \frac{n(n-1)(n-2)}{1 \cdot 2 \cdot 3} (n-3)^n + \&c.$

There, is however, a very ingenious demonstration of it, depending only upon first principles, given by S. Burke, esq. in vol. ix. of the Transactions of the Irish Academy.

We might have added here many other curious properties of numerical powers, but we prefer subjoining the following table of the first 10 powers of all numbers from 1 to 100, which is remarkably useful in a variety of arithmetical operations; and for farther information relating to the properties of powers, their divisors, forms, &c. we must refer the reader to Legendre's Essai sur la Théorie des Nombres, to Gauss's Disquisitiones Arithmeticae, and to Barlow's Elementary Investigations of the Theory of Numbers. See also vol. ix. of the Trans. Irish Acad.

POWER.

The first Ten Powers from 1 to 100.

1st Po.	2d Power.	3d Power.	4th Power.	5th Power.	6th Power.
1	1	1	1	1	1
2	4	8	16	32	64
3	9	27	81	243	729
4	16	64	256	1024	4096
5	25	125	625	3125	15625
6	36	216	1296	7776	46656
7	49	343	2401	16807	117649
8	64	512	4096	32768	262144
9	81	729	6561	59049	531441
10	100	1000	10000	100000	1000000
11	121	1331	14641	161051	1771561
12	144	1728	20736	248832	2985984
13	169	2197	28561	371293	4826809
14	196	2744	38416	537824	7529536
15	225	3375	50625	759375	11390625
16	256	4096	65536	1048576	16777216
17	289	4913	83521	1419857	24137569
18	324	5832	104976	1889568	34012224
19	361	6859	130321	2476099	47045881
20	400	8000	160000	3200000	64000000
21	441	9261	194481	4084101	85766121
22	484	10648	234256	5153632	113379904
23	529	12167	279841	6436343	148035889
24	576	13824	331776	7962624	191102976
25	625	15625	390625	9765625	244140625
26	676	17576	456976	11881376	308915776
27	729	19683	531441	14348907	387420489
28	784	21952	614656	17210368	481890304
29	841	24389	707281	20511149	594823321
30	900	27000	810000	24300000	729000000
31	961	29791	923521	28629151	887503681
32	1024	32768	1048576	33554432	1073741824
33	1089	35937	1185921	39135393	1291467969
34	1156	39304	1336336	45435424	1544804416
35	1225	42875	1500625	52521875	1838265625
36	1296	46656	1679616	60466176	2176782336
37	1369	50653	1874161	69343957	2565726409
38	1444	54872	2085136	79235168	3010936384
39	1521	59319	2313441	90224199	3518743761
40	1600	64000	2560000	102400000	4096000000
41	1681	68921	2825761	115856201	4750104241
42	1764	74088	3111696	130691232	5489031744
43	1849	79507	3418801	147008443	6321363049
44	1936	85184	3748096	164916224	7256313856
45	2025	91125	4100625	184528125	8303765625
46	2116	97336	4477456	205962976	9474296896
47	2209	103823	4879681	229345007	10779215329
48	2304	110592	5308416	254803968	12230590464
49	2401	117649	5764801	282475249	13841287201
50	2500	125000	6250000	312500000	15625000000

POWER.

The first Ten Powers from 1 to 100.

1st Po.	7th Power.	8th Power.	9th Power.	10th Power.
1	1	1	1	1
2	128	256	512	1024
3	2187	6561	19683	59049
4	16384	65536	262144	1048576
5	78125	390625	1953125	9765625
6	279936	1679616	10077696	60466176
7	823543	5764801	40353607	282475249
8	2097152	16777216	134217728	1073741824
9	4782969	43046721	387420489	3486784401
10	10000000	100000000	1000000000	10000000000
11	19487171	214358881	2357947691	25937424601
12	35831808	429981696	5159780352	61917364224
13	62748517	815730721	10604499373	137858491849
14	105413504	1475789056	20661046784	289254654976
15	170859375	2562890625	38443359375	576650390625
16	268435456	4294967296	68719476736	1099511627776
17	410338673	6975757441	118587876497	2015993900449
18	612220032	11019960576	198359290368	3570467226624
19	893871739	16983563041	322687697779	6131066257801
20	1280000000	25600000000	512000000000	10240000000000
21	1801088541	37822859361	794280046581	16679880978201
22	2494357888	54875873536	1207269217792	26559922791424
23	3404825447	78310985281	1801152661463	41426511213649
24	4586471424	110075314176	2641807540224	63403380965376
25	6103515625	152587890625	3814697265625	95367431640625
26	8031310176	208827064576	5429503678976	141167095653376
27	10460353203	282429536481	7625597484987	205891132094649
28	13492928512	377801998336	10578455953408	296196766695424
29	17249876309	500246412961	14507145975869	420707233300201
30	21870000000	656100000000	19683000000000	590490000000000
31	27512614111	852891037441	26439622160671	819628286980801
32	34359738368	1099511627776	35184372088832	1125899906842624
33	42618442977	1406408618241	46411484401953	1531578985264449
34	52523350144	1785793904896	60716992766464	2064377754059776
35	64339296875	2251875390625	78815638671875	2758547353515625
36	78364164096	2821109907456	101559956668416	3656158440062976
37	94931877133	3512479453921	129961739795077	4808584372417849
38	114411582592	4347792138496	165216101262848	6278211847988224
39	137231006679	5352009260481	208728361158759	8140406085191601
40	163840000000	6553600000000	262144000000000	10485760000000000
41	194754273881	7984925229121	327381934393961	13422659310152401
42	230529333248	9682651998416	406671383849472	17080198121677824
43	271818611107	11688200277601	502592611936843	21611482313284249
44	319277809664	14048223625216	618121839509504	27197360938418176
45	373669453125	16815125390625	756680642578125	34050628916015625
46	435817657216	20047612231936	922190162669056	42420747482776576
47	506623120463	23811286661761	1119130473102767	52599132235830049
48	587068342272	28179280429056	1352605460594688	64925062108545024
49	678223072849	33232930569601	1628413597910449	79792266297612001
50	781250000000	39062500000000	1953125000000000	97656250000000000

POWER.

The first Ten Powers from 1 to 100.

1st Po.	2d Power.	3d Power.	4th Power.	5th Power.	6th Power.
51	2601	132651	6765201	345025251	17596287801
52	2704	140608	7311616	380204032	19770609664
53	2809	148877	7890481	418195493	22164361129
54	2916	157464	8503056	459165024	24794911296
55	3025	166375	9150625	503284375	27680640625
56	3136	175616	9834496	550731776	30840979456
57	3249	185193	10556001	601692057	34296447249
58	3364	195112	11316496	656356768	38068692544
59	3481	205379	12117361	714924299	42180533641
60	3600	216000	12960000	777600000	46656000000
61	3721	226981	13845841	844596301	51520374361
62	3844	238328	14776336	916132832	56800235584
63	3969	250047	15752961	992436543	62523502209
64	4096	262144	16777216	1073741824	68719476736
65	4225	274625	17850625	1160290625	75418890625
66	4356	287496	18974736	1252332576	82653950016
67	4489	300763	20151121	1350125107	90458382169
68	4624	314432	21381376	1453933568	98867482624
69	4761	328509	22667121	1564031349	109918163081
70	4900	343000	24010000	1680700000	117649000000
71	5041	357911	25411681	1804229351	128100283921
72	5184	373248	26873856	1934917632	139314069504
73	5329	389017	28398241	2073071593	151534226259
74	5476	405224	29986576	2219006624	164206490176
75	5625	421875	31640625	2373046875	177978515625
76	5776	438976	33362176	2535525376	192699928576
77	5929	456533	35153041	2706784157	208422380089
78	6084	474552	37015056	2887174368	225199600704
79	6241	493039	38950081	3077056399	243087455521
80	6400	512000	40960000	3276800000	262144000000
81	6561	531441	43046721	3486784101	282429536481
82	6724	551368	45212176	3707398432	304006671424
83	6889	571787	47458321	3939040643	326940373369
84	7056	592704	49787136	4182119424	351298031616
85	7225	614125	52200625	4437053125	377149515625
86	7396	636056	54700816	4704270176	404567235136
87	7569	658503	57289761	4984209207	433626201009
88	7744	681472	59969536	5277319168	464404086784
89	7921	704969	62742241	5584059449	496981290961
90	8100	729000	65610000	5904900000	531441000000
91	8281	753571	68574961	6240321451	567869252041
92	8464	778688	71639296	6590815232	606355001344
93	8649	804357	74805201	6956883693	646990183449
94	8836	830584	78074896	7339040224	689869781056
95	9025	857375	81450625	7737809375	735091890625
96	9216	884736	84934656	8153726976	782757789696
97	9409	912673	88529281	8587340257	832972004929
98	9604	941192	92236816	9039207968	885842380864
99	9801	970299	96059601	9509900499	941480149401

POWER.

The first Ten Powers from 1 to 100.

1st Po.	7th Power.	8th Power.	9th Power.	10th Power.
51	897410677851	45767944570401	2334165173090451	119042423827613001
52	1028071702528	53459728531456	2779905883635172	144555105949057024
53	1174711139837	62259690411361	3299763591802133	174887470365513049
54	1338925209984	72301961339136	3904305912313344	210832519264920576
55	1522435234375	83733937890625	4605366583984375	253295162119140625
56	1727094849536	96717311574016	5416169448144896	303305489096114176
57	1954897493193	111429157112001	6351461955384057	362033331456891249
58	2207984167552	128063081718016	7427658739644928	430804206899405824
59	2488651484819	146830437604321	8662995818654939	511116753300641401
60	2799360000000	167961600000000	10077696000000000	604661760000000000
61	3142742836021	191707312997281	11694146092834141	713342911662882601
62	3521614606208	218340105584896	13537086546263552	839299365868340224
63	3938980639167	248155780267521	15633814156853823	984930291881790849
64	4398046511104	281474976710656	18014398509481984	1152921504606846976
65	4902227890625	318644812890625	20711912837890625	1346274334462890625
66	5455160701056	360040606269696	23762680013799936	1568236880910795776
67	6060711605323	406067677556841	27206534396294947	1822837804551761449
68	6722988818432	457163239653376	31087100296429568	2113922820157210624
69	7446353252589	513798374428641	35452087835576229	2446194060654759801
70	8235430000000	576480100000000	40353607000000000	2824752490000000000
71	9095120158391	645753531245761	45848500718449031	3255243551009881201
72	10030613004288	722204136308736	51998697814228992	3743906242624487424
73	11047398519097	806460091894081	58871556708267913	4297625829703557649
74	12151280273024	899194740203776	66540410775079424	4923990397355877376
75	13348388671875	1001129150390625	75084686279296875	5631351470947265625
76	14645194571776	1113034787454976	84590643846578176	6428888932339941376
77	16048523266853	1235736291547681	95151694449171437	7326680472586200649
78	17565568854912	1370114370683136	106868920913284608	8335775831236199424
79	19203908986159	1517108809906561	119851595982618319	9468276082626847201
80	20971520000000	1677721600000000	134217728000000000	10737418240000000000
81	22876792454961	1853020188851841	150094635296999121	12157665459056928801
82	24928547056768	2044140858654976	167619550409708032	13744803133596058624
83	27136050989627	2252292232139041	186940255267540403	15516041187205853449
84	29509034655744	2478758911082496	208215748530929664	17490122876598091776
85	32057708828125	2724905250390625	231616946283203125	19687440434072265625
86	34792782221696	2992179271065856	257327417311663616	22130157888803070976
87	37725479487783	3282116715437121	285544154243029527	24842341419443568849
88	40867559636992	3596345248055296	316478381828866048	27850097600940212224
89	44231334895529	3936588805702081	350356403707485209	31181719929966183601
90	47829690000000	4304672100000000	387420489000000000	34867844010000000000
91	51676101935131	4702525276151521	427929800129788411	38941611811810745401
92	55784660123648	5132188731375616	472161363286556672	43438845422363213824
93	60170087060757	5595818096650401	520411082988487293	48389230717929318249
94	64847759419264	6095689385410816	572994802228616704	53861511409489970176
95	69833729609375	6634204312890625	630249409724609375	59873693923837890625
96	75144747810816	7213895789838336	692533995824480256	66483263599150104576
97	80798184478113	7837433594376961	760231058654565217	73742412689492826049
98	86812553324662	8507630225817856	833747762130149888	81707280688754689024
99	93206534790699	9227446944279201	913517247483640899	90438207500880449001

POWER, in *Mechanics*, denotes a force, which, being applied to a machine, tends to produce motion; whether it does actually produce it or not.

In the former case it is called a *moving power*; in the latter, a *sustaining power*.

If the power be a man, or a brute, it is called an *animate power*; if the air, water, fire, gravity, or elasticity, an *inanimate power*.

POWER, *Attractive*. See ATTRACTIVE.

POWER, *Conspiring*. See CONSPIRING.

POWER, *Repelling*. See REPELLING.

POWER is also used for any of the six simple machines, *viz.* the *lever, balance, screw, axis in peritrochio, wedge, and pulley*; which are particularly called the *MECHANIC powers*, which see.

See also each power under its proper article, LEVER, BALANCE, &c.

POWER, *Maintaining, or Maintaining power*, in *Horology*, is that extraneous force which is applied in a clock or watch, to maintain or perpetuate the natural vibrations of a pendulum, or oscillations of a balance, which would otherwise come to rest, by reason of friction in the mechanism, and the resistance opposed by the air to the parts in motion. This power, in the larger clocks, is usually a suspended weight; but in the portable clocks and watches, it is a spring, coiled in a metallic box, that actuates the wheelwork, by gradually unbending itself: in the former of these cases, the weight is suspended by a cord, or chain, that is coiled round a cylinder when wound up, which cylinder, being of uniform diameter throughout its length, is acted on by the cord, when fast at the interior end, by a similar force in every situation; and, therefore, imparts through the train, that is connected with its great wheel, invariable impulses to the escapement-wheel, at every vibration of the pendulum; which pendulum receives therefrom such a slight push, as is just sufficient to restore the momentum that it loses from friction and resistance of the air; and thus the uniform motion of the pendulum is perpetuated, or would be perpetuated, if no impediment from dirt, from the thickening of oil, or from wear, &c. were to interfere with the regularity of its action. But when a spring is substituted for a weight, its agency is not uniform, without some mechanical correction to equalize it: this correction is effected by the *FUSEE*, which we have already explained in its proper place, but which is seldom so completely proportioned to the varying forces of the opening spring, as to be at all times equal to a weight suspended from an uniform cylinder. Hence have originated various escapements in horological machines, either to correct or to obviate the inequalities of the maintaining power, after it has been modified by transmission through the train of wheelwork, that is necessary both for limiting its quantity, and lengthening the time of its action. The whole quantity of maintaining power that is expended in a given time, when a weight is used, is the product of the weight into its descent, in inches and parts, from its situation at the commencement of action, and therefore the slower the fall is, the greater must be the weight, and *vice versa*, when a given quantity is necessary for maintaining the vibrations in an undiminished state for the requisite duration. Hence a clock may be made to go at one winding, any length of time, from a day to a year, or more; but the most usual time, and perhaps as unobjectionable as any, is something more than a week, for which a weight of from ten to twelve pounds is sufficient, with an ordinary cylinder and double cord. In general, an excess of maintaining power is injurious to the natural motion of a pendulum or balance; but as different escapements require different de-

grees of power to produce the requisite effect, it would not be an easy matter to calculate the exact quantity that would be best in all cases, even if the same power were requisite in all states of foulness of the machine. The best rule in practice is to adopt that weight which experience has pointed out as adequate to its purpose, and if, on trial, a little addition or diminution of the power is found to bring the vibration to the most desirable length; the weight so changed will be proper to make choice of. In those particular escapements which are called *isochronal*, an increase or diminution of the power, though they affect the total length of the vibration, will not alter the time; and, therefore, with respect to them, the exact quantity of power is not of so much importance as in other escapements, provided it be sufficient, under all circumstances, to make the total vibration exceed the arc of escapement, so as to prevent quiescence. In those escapements which are denominated *remontoir*, the maintaining power does not itself act on the escapement-wheel, but serves only to raise a pair of small weights, or to wind up a couple of small springs, that become substitutes for the maintaining power, by giving their small alternate impulses at each vibration or oscillation, without variation in the intensity of each impulse, which is a great improvement in the art of clock-making and watch-making, particularly where the escapement is of the detached description; for whatever irregularities might arise from the transmission of the modified power, through the train, in different states of the weather, or of foulness, these irregularities, not influencing the effective forces derived from the secondary weights or springs alone, do not affect the pendulum or balance, that is actuated solely by one or other of these invariable powers, though these powers are under the agency of the maintaining power themselves, at certain intervals, more or less distant.

It has been asserted, that if the weight of a pendulum-bob be increased inversely as the square of the arc of vibration is diminished, and *vice versa*, the maintaining power must remain the same, but the experiments of F. Berthoud, as reported in his 14th chap. of his "Essai sur l'Horlogerie," prove that this is far from being the case in practice, and that no theory, which has yet been proposed, is competent to the calculation of the exact maintaining power, that shall make a given pendulum move in a given arc, with all the variety of escapements; it appears, however, to be agreed on, that a heavy bob, moving in a small arc, with a comparatively small maintaining power, is most conducive to invariable regulation in a clock; but that in a watch, a large arc of oscillation is necessary, in order to obtain sufficient momentum. See ESCAPEMENT.

POWER, in *Optics*. The *power of a glass* is used by some for the distance of the convexity from its solar focus.

POWER, *Commensurable in*. See COMMENSURABLE.

POWER of the County. See POSSE Comitatus.

POWER, in the *Feodal Jurisprudence*, a right which the lord has to reunite to his fief a dependent fee held of him, when the vassal has alienated it, upon reimbursing the money given for it, with legal costs.

The lord is to exercise his power over the fee within a year after he has notice of the fall; otherwise he loses it. The word is also used for the right a lord has to seize a dependent fee, to compel the payment of all dues, services, &c.

POWERS, *Potentiae*, are also used among the fathers, &c. for the sixth order in the hierarchy of angels, reckoning from seraphim.

These they suppose to be the spirits who bridle and restrain the power of the devils; preside over inferior causes; and prevent

prevent contrary qualities from disturbing the economy of the world. See *ANGEL* and *HIERARCHY*.

POWER, *Balance of*, in *Political Economy*, denotes such a disposition of things in a single state, or among different nations, that no power is able absolutely to predominate, or to prescribe laws to others. The surest means for preserving this balance or equilibrium would be that no power should be much superior to the others, and that all, or at least the greater part, should be nearly equal in force. This project is attributed to Henry IV. ; but it could not be executed without injustice and violence. Besides, if equality had been established, how could it be always supported by lawful means? Commerce, industry, military virtues, would soon put an end to it. The right of inheriting sovereignties, even in favour of women and their descendants, so absurdly settled, and yet if settled, would overthrow this system. It is more natural, easy, and just, to have recourse to the means of forming confederacies for making head against the most powerful, and hindering him from dictating law. This, till the distraction and confusion of the last 20 or 30 years (1813), has been observed by the sovereigns of Europe. They consider the two principal powers, which on that very account are naturally rivals, as destined to be checks on each other, and unite with the weakest, like so many weights thrown into the lightest scale, for keeping one in equilibrium with the other. The house of Austria was long the preponderating power, but of late times France has taken her turn. England, the opulence and fleets of which have had a great influence, without alarming any state with regard to its liberty, has had in the common course of things the glory of holding this political balance. It has been watchful to keep it in equilibrium, which is really a very wise and just policy, and will be ever highly valuable, whilst the means it makes use of are only alliances, confederacies, and others equally lawful. Confederacies would be a sure way of preserving the equilibrium, and supporting the liberty of nations, if all princes thoroughly understood their true interests, and regulated all their steps for the good of the state. But great powers are too successful in gaining over partizans and allies, who blindly surrender themselves to their views. Dazzled by the lustre of a present advantage, seduced by their avarice, deceived by wicked ministers, how many princes become the tools of a power, which at one time or other may swallow up either themselves or their successors? Thus the safest way, when a favourable opportunity offers, and it can be done with justice, is to weaken him who infringes upon the equilibrium; and by every honest method hinder his acquiring too formidable a degree of power. For this purpose the interested nations should be especially attentive not to suffer him to aggrandize himself by arms, and this they may always do with justice. For if this prince makes an unjust war, every one has a right to succour the oppressed. If he makes a just war, neutral nations may interfere as mediators for an accommodation, induce the weaker side to offer a just satisfaction with reasonable terms, and not permit it to fall under the weight of the conqueror. On the offer of equitable conditions to the prince who makes even the most just war, he has all that he can demand. The justice of his cause never gives him a right of absolutely seducing his enemy, unless when this extremity becomes necessary to his safety; or in the want of any other means of indemnifying him for the injury he has received. But this is not the case in the present instance, as the interposing nations can in another manner procure him a just satisfaction, and assurance of safety. If this formidable power should plainly entertain designs of oppression and conquest, and manifest its views by making preparations or other motions, the neighbouring nations have an unquestionable

right to prevent it; but if the fate of war declares on their side, they have a further right to avail themselves of this happy opportunity for weakening and reducing a power too contrary to the equilibrium, and dangerous to the common liberty. This right of nations is still more evident against a sovereign, who from a precipitate ardour of running to arms without reason, or even so much as plausible pretences, is continually disturbing the public tranquillity.

Mr. Hume observes, that in all the polities of Greece, the anxiety with regard to the balance of power, is apparent, or expressly pointed out to us by the ancient historians. Thucydides (lib. i.) represents the league which was formed against Athens, and which produced the Peloponnesian war, as entirely owing to this principle. And after the decline of Athens, when the Thebans and Lacedæmonians disputed for sovereignty, we find, that the Athenians (as well as many other republics) always threw themselves into the lighter scale, and endeavoured to preserve the balance. They supported Thebes against Sparta, till the great victory gained by Epaminondas at Leuctra; after which they immediately went over to the conquered, from generosity as they pretended, but in reality from their jealousy of the conquerors. Upon the first rise of the Macedonian power, Demosthenes immediately discovered the danger, founded the alarm throughout all Greece, and at last assembled that confederacy under the banners of Athens, which fought the great and decisive battle of Chæronea. However, if we attentively consider the state of Greece and the character of its inhabitants, we shall perceive that the balance of power was of itself sufficiently secured in that country, and that it was unnecessary to guard it with that caution which may be requisite in other nations and ages. The Persian monarch was, with regard to his force, a petty prince compared with the Grecian republics, and therefore it behoved him from views of safety to interest himself in their quarrels, and to support the weaker side in every contest; and thus the fate of the Persian empire was prolonged for near a century. The successors of Alexander manifested great jealousy concerning the balance of power; and their jealousy was founded on true politics and prudence, and preserved distinct for several ages the partition made after the death of that famous conqueror. In subsequent times we find, that as the Eastern princes considered the Greeks and Macedonians as possessing the only real military force with which they had any intercourse, they kept always a watchful eye over that part of the world.

It has been supposed, however, that the ancients were entirely ignorant of the balance of power; and this opinion seems to have been formed from an attention to the Roman history more than the Grecian. As to the Romans, it must be allowed, that they never met with any such general combination or confederacy against them as might naturally have been expected from their rapid conquests and declared ambition, but they were allowed peaceably to subdue their neighbours, one after another, till they extended their dominion over the whole known world. Upon Hannibal's invasion of the Roman state, a crisis occurred, which ought to have roused the attention of all civilized nations. Nevertheless, though this was in reality a contest for universal empire, no prince or state seems to have been in the least alarmed about the event or issue of the quarrel. The only prince in the Roman history, who seems to have understood the balance of power, is Hiero, king of Syracuse. Although the ally of Rome, he assisted the Carthaginians, esteeming it requisite, as Polybius says (lib. i. cap. 83.) both in order to retain his own dominions in Sicily, and to preserve the Roman friendship, that Carthage should be safe; lest by its fall the remaining power should be able, without contrast or opposition, to execute every purpose and undertaking. And here he acted, says the same writer,

with great wisdom and prudence. For that is never on any account to be overlooked; nor ought such a force ever to be thrown into one hand, as to incapacitate the neighbouring states from defending their rights against it. Here, says Mr. Hume, the rise of modern politics is pointed out in express terms. In short, as he proceeds, the maxim of preserving the balance of power is founded so much on common sense and obvious reasoning, that it is impossible it could have altogether escaped antiquity, where we find in other particulars so many marks of deep penetration and discernment. If it was not so generally known and acknowledged as at present, it had, at least, an influence on all the wiser and more experienced princes and politicians, and, indeed, even at present, however generally known and acknowledged among speculative reasoners, it has not, in practice, an authority much more extensive among those who govern the world. After the fall of the Roman empire, the form of government, established by the Northern conquerors, incapacitated them, in a great measure, for farther conquests, and long maintained each state within its proper boundaries. But when vassalage and the feudal militia were abolished, mankind were anew alarmed by the danger of universal monarchy from the union of so many kingdoms and principalities in the person of the emperor Charles. The power of the house of Austria succeeded; but its dominions, though extensive, were divided, and supported by riches, derived chiefly from mines of gold and silver; and it was therefore more likely to decay from internal defects than to overthrow the bulwarks raised against it. In less than a century it sunk, and was succeeded by a new power, more formidable to the liberties of Europe, possessing the advantage of the former without its defects, excepting only a share of that spirit of bigotry and persecution with which the house of Austria long continued to be infatuated. Another power has lately sprung up in France, and having risen from a small beginning to an enormous and gigantic size, so that like a large colossus it was bestriding the whole of Europe, it became necessary to form a general confederacy against it, the exertions of which have been attended with signal success, and not only prognosticated but produced a favourable issue at the present moment (1814). Against this ambitious power, extending the observations of Mr. Hume to our own times, Great Britain has stood foremost, and she still maintains her station, in connection with other very powerful and active allies. Besides her advantages of riches and situation, her people are animated with such a national spirit, and are so fully sensible of the blessings of their government, that we may hope their vigour will never languish in so necessary and just a cause. The errors of Great Britain have more frequently proceeded from a laudable excess of ardour, than from a blameable deficiency. Hence it has happened, that our alertness in defence of our allies, in our opposition to French power, has, on some occasions, led them to reckon upon our force as upon their own, and expecting to carry on war at our expence, they have refused reasonable terms of accommodation. Besides, we are such true combatants, that, when once engaged, we lose all concern for ourselves and our posterity, and consider only how we may most effectually annoy the enemy. Vattel's Law of Nations, b. iii. chap. 3. Hume's Ess. vol. i. pt. 2. ess. 7. See BALANCE of the Constitution, BALANCE of Power, and WAR.

POWER of Attorney, in Commerce, an instrument or deed by which a person is authorized to act for another, either generally, or in any specific transaction. By this instrument, a merchant resident abroad empowers and authorizes his agent to accept or negotiate bills of exchange, and to make contracts in the name and upon the responsibility of his principal. A power of attorney is, in its nature, revo-

cable, and its revocation may also be either general or special. See ATTORNEY and LETTER of Attorney.

POWERSCOURT, in Geography, a village of the county of Wicklow, Ireland, near which are the romantic scenes of the Dargle and Waterfall, much frequented by parties from Dublin, and visited by every traveller in Ireland, whose object is to view the beauties of nature. Near it is the feat of that honour to his country, the Rt. Hon. H. Grattan. Powerscourt is $10\frac{1}{2}$ miles from Dublin.

POWHATAN, a county of Virginia, containing 8072 inhabitants. It is bounded N. by James river, which separates it from Goochland, and S. by Amelia county.—Also, the ancient name of James river, in Virginia.

POWICSVISKO, a town of the duchy of Warsaw; 13 miles W. of Gnesna.

POWIS LAND, or Powys Land, in Geography, one of the three districts or territories, anciently called kingdoms, into which Wales was divided by Rodericus Magnus, king of Wales, about A.D. 870; the other two territories were Gwynedd, or North Wales, and Deheubarth or South Wales. In each of these he ordained a princely seat or court; that of Gwynedd was Aberffraw in the isle of Môn, or Anglesey; that of Deheubarth, called in Latin Demetia, Caermarthen, whence it was afterwards removed to Dynefour, at the distance of about eight miles; and that of Powys Land, Pengwern, called Y Mwythig, and in English Shrewsbury, whence it was removed to Mathrafael in Powys land. This kingdom, sometimes called Mathrafael, was divided into Powys Fadoc, containing five cantrefs and 15 comots, and Powys Wenwynwyn, including five cantrefs and 12 comots. To the kingdom of Mathrafael belonged the land between Wye and Severn, containing four cantrefs and 13 comots. See WALES.

POWLAMYA, PULOMAYA, and Powlumi, in Mythology, names of the Hindoo goddesses Indrani, consort of Indra. See those articles.

POWNAL, in Geography, a flourishing township of America, in Bennington county, and S.W. corner of the state of Vermont; containing 1655 inhabitants. Mount Belcher, a portion of which is within this town, stands partly in three of the states, viz. New York, Vermont, and Massachusetts. Mount Anthony, also one of the most remarkable mountains in Vermont, lies between this and Bennington. Hoosack river winds beautifully through the S. part of this town.—Also, a town of Cumberland county, in the district of Maine, containing 872 inhabitants.

POWNAL'S Island, an island near the E. coast of Labrador. N. lat. $57^{\circ} 10'$. W. long. $61^{\circ} 15'$.

POWNALL, THOMAS, in Biography, a miscellaneous writer, was born in 1722, and educated at Lincoln. He went to America in 1753, and was appointed governor of New Jersey, and afterwards of Massachusetts. In 1760 he removed to the government of South Carolina. After his return from America, he became comptroller-general of the expenditure and accounts of the extraordinaries of the army in Germany. He served in three parliaments; after which he retired wholly from public business, and died at Bath in 1805. His works are "Memoirs on Drainage and Navigation;" "Letter to Adam Smith on several Points treated of in his Enquiry into the Wealth of Nations;" "Topographical Description of North America;" "Treatise on Antiquities;" "Memorial addressed to the Sovereigns of America;" "The Right, Interest, and Duty of Government, as concerned in the Affairs of the East Indies;" "Intellectual Physics;" "An Essay concerning the Nature of Being;" "A Treatise on Old Age," and other pieces.

POWOW, in Geography, a small river of America, in Essex county, Massachusetts, which rises in Kingston, New

Hampshire, and runs into Merrimack river, seven miles from the sea, between the found of Salisbury and Amesbury. It is navigable a mile from its mouth, and many vessels are built upon its banks.

POWTER, or *English Powter*, the name of a peculiar species of pigeon, called by Moore the *columba gutturosa Anglica*. See COLUMBA.

It was first bred in England, and is of a mixed breed, between what is called the horseman and the cropper. It is a very beautiful species, and is valued for its length of legs and body, neatness of crop, and slenderness in girth, added to the beauty of its feathers. This species is often eighteen, sometimes twenty inches long from the end of the bill to the extremity of the tail; its legs, from the upper joint of the thigh to the toe-nail, are sometimes seven inches; the crop is large and round, especially toward the beak, filling also behind, and making almost a perfectly orbicular figure. They are either blue-pied, black-pied, red-pied, or yellow-pied; the last colour is most valued. See PIGEON.

POWTER, *Parisian*, a species of pigeon called by Moore *columba gutturosa Parisiorum*.

It was first bred at Paris, and thence sent to Brussels, whence it was afterwards brought into England. It resembles the English powter, but is short-bodied, short-legged, thick in the girth, and long-cropped. It is admired for the beauty of its feathers, which is peculiar to itself; it resembling in this a fine piece of that sort of needlework which the ladies call the Irish stitch, being chequered with various colours in every feather, except the flight, which is white. It has generally a good deal of red intermixed with the other colours, and the more it has of this, the more it is esteemed. See PIGEON.

POWTING HORSEMAN, a name given to a mixed breed of pigeons, produced between those two kinds, known by the names of the *cropper* and the *horseman*, according to the number of times that the young are bred over from the cropper. They are distinguished by the name of the first, second, or third breed.

These are a very agile and nimble pigeon; and by their continually flying up and down about the dove-house, are apt to bring in other stray pigeons; which cannot find their houses. They are observed to breed often, and take great care of their young ones. See PIGEON.

POWZOLS, in *Geography*, a town of France, in the department of the Herault; 18 miles N.E. of Beziers.

POX, in *Medicine*, the plural of *pock*, which signifies a pustula or large vesicle, prominent upon the skin. Whence the term is applied to several diseases, in which different pustular and vesicular eruptions appear on the skin; such as the French pox, great pox, or pox simply, (signifying the venereal disease); the small-pox; chicken-pox; swine-pox; &c.

POX, *Chicken*. See VARICELLA.

POX, *French*. See LUES VENEREA.

POX, *Small*. See SMALL-POX.

POX, *Swine*. See VARICELLA.

POYAIS, in *Geography*, a town of Mexico, in the province of Honduras, on the W. side of Black river; 55 miles S. of Cape Cameron, which forms the N. point of the entrance of the river into the sea of Honduras.

POYAMONY, a town of Hindoostan, in the Carnatic; 11 miles W.N.W. of Trichinopoly.

POYANG, a lake of China, in the province of Kiang-si, the largest collection of waters within the Chinese dominions. It lies in the midst of a great extent of flat and swampy land; and for some miles on every side of it, the face of the country is a wild and morassy waste, covered with reeds and rushes, and entirely inundated for a part of the year.

Not a village is to be seen, nor any traces of habitations, except here and there a mean solitary hut for the residence of a fisherman, accessible sometimes only by a boat. These wretched beings subsist by fishing, and by raising vegetables on hurdles of bamboo resting upon marshes, or floating upon the surface of the water. This lake and the adjacent country may be literally termed the common sewer of China. Rivers flow into it from most points of the compass; several canals have been formed from it, and inclosed within high banks for the security of vessels in the season of tempests and inundations. The billows of the lake rise occasionally to such a height as to render it, in the opinion of the Chinese mariners, no less dangerous than the sea. In the lake are scattered small sandy islands just peeping above the surface of the water, and covered with terrible dwellings, the abodes of fishermen. The Poyang, which is said to be about 200 miles in circumference, after having collected the waters of several rivers, empties itself into the Yang-tse-kiang, and contributes in no small degree to the magnitude of that stream. The adjacent country, consisting of swampy ground to the E. and S. of the lake, is distributed into fishing ponds, in which each proprietor breeds and fattens his fish, of which some are a small species like sprats, which dried and salted, become an object of commerce throughout the empire. Water-fowl are also plentiful in this part of the country, and form a part of its resources. The city Nang-kang is situated on the banks of this lake. Staunton's Emb. vol. ii.

POYERA, or PETRI GRANDE, a town of Africa, in the district of Anta, on the Gold coast.

POYEYSEIE, a town of Lithuania, on the Niemen; 61 miles S.E. of Kowée.

POYNINGS, Sir EDWARD, in *Biography*, a gentleman of Kent, was sent by Henry VII. to Ireland, which he governed with courage and prudence: the object of his mission was to quell the partisans of the house of York, and to reduce the natives to subjection. He was not supported by forces sufficient for that enterprise. The Irish, by flying into their woods and mountains, eluded his efforts. But he summoned a parliament at Dublin, in which he was more successful, and passed that memorable statute, which for more than three centuries was referred to by the name of Poynings' law, and which established the authority of the English government in Ireland. By this statute, all the former laws of England were made to be of force in Ireland; and no bill could be introduced into the Irish parliament, unless it had previously received the sanction of the privy council of England. The UNION (which see) in 1800 has changed the whole system of government. In the reign of Henry VIII. Poynings was made privy counsellor, and appointed governor of Tournay. Hume and Rapin.

POYNINGS' Law, a set of statutes enacted in the 10 Hen. VII. one of which (cap. 4.) in order to restrain the power as well of the deputy as the Irish parliament, provides, 1. That before any parliament be summoned or holden, the chief governor and council of Ireland shall certify to the king, under the great seal of Ireland, the considerations and causes of it, and the articles of the acts proposed to be passed in it. 2. That after the king in his council of England, shall have considered, approved, or altered the said acts or any of them, and certified them back under the great seal of England, and shall have given licence to summon and hold a parliament, then the same shall be summoned and held: and in it the said acts so certified, and no other, shall be proposed, received, or rejected. But it was afterwards provided by 3 & 4 Ph. & M. cap. 4. that any new propositions might be certified to England in the usual forms, even after the summons, and during the session of parliament. By this means, however, there was nothing left to the parliament

liament in Ireland, but a bare negative or power of rejecting, not of proposing or altering any law. But the usage has since been, that bills were often framed in either house under the denomination of "heads for a bill or bills," and in that shape they were offered to the consideration of the lord-licutenant and privy council; who, upon such parliamentary intimation, or otherwise upon the application of private persons, received and transmitted such heads, or rejected them, without any transmission to England. And with regard to Poynings' law in particular, it could not be repealed or suspended, unless the bill for that purpose, before it were certified to England, were approved by both the houses. Irish stat. 11 Eliz. stat. 3. cap. 38.

It was also enacted by another of Poynings' laws (cap. 22.) that all acts of parliament, before made in England, should be of force within the realm of Ireland. But by the same rule that no laws made in England, between king John's time and Poynings' law, were then binding in Ireland, it followed that no acts of the English parliament, made since the 10 Hen. VII. did bind the people of Ireland, unless specially named or included under general words.

These laws took their name, as we have before observed, from sir Edward Poynings, who was lord-deputy at the time when they were enacted; before which time, the original method of passing statutes in Ireland was nearly the same as in England, the chief governor holding parliaments at his pleasure, which enacted such laws as they thought proper.

With respect to the dependent state of Ireland, it was declared by 6 Geo. I. cap. 5. that the kingdom of Ireland ought to be subordinate to, and dependent upon, the imperial crown of Great Britain, as being inseparably united to it; and that the king's majesty, with the consent of the lords and commons of Great Britain in parliament, hath power to make laws to bind the people of Ireland. But this act was repealed in 1782; and a new state of things has taken place since the *Union*; which see.

POYO, in *Geography*, a town of Spain, in Galicia; 21 miles S.E. of Lugo.

POYSIS, a town of Sweden; 22 miles N.N.E. of Abo.

POYUCAR, a town of Brasil; 21 miles S. of Fernambuco.

POZEGI, a town of Russia, in the government of Pskov; 28 miles S.S.W. of Toropeta.

POZOBLANCO, a town of Spain, in the province of Cordova; 28 miles N. of Cordova.

POZON, one of the smaller Philippine islands, near the W. coast of Leyta. N. lat. $10^{\circ} 43'$. E. long. $124^{\circ} 24'$.

POZORUBIO, a town of Spain, in New Castile; 28 miles S.S.W. of Huete.

POZZI, ANNA, in *Biography*, an Italian female singer, who arrived here in the autumn of 1776, as successor to the Gabrielli: but though young, handsome, and possessed of a voice uncommonly clear, sweet, and powerful, her want of experience, both as a singer and actresses, rendered her reception not very flattering, after so celebrated a performer as Gabrielli, though the public had never been in good humour with her during her whole residence in England, nor, we think, ever rendered justice to her talents. Before the season was far advanced, the Pozzi was superseded by Miss Davis; and after this degradation, she generally appeared as second woman, in which character she was always thought as superior to the singers of that rank as any of the first women to whom she was obliged to give the *pas*, were to herself. She left England in 1778; and the spirit and brilliancy of her voice, with more experience, soon rendered her one of the first and most admired singers in Italy; where, by the year 1784, she had sung as first woman in all the great theatres, till she had worked her

way to Naples, which is regarded as the post of honour for singers. But alas! she enjoyed this station only a short time ere she was seized by a fever, which carried her off, in the flower of her age, from the summit of vocal glory.

POZZI, in *Geography*, a town of Naples, in the province of Otranto; 3 miles S.W. of Oria.

POZZO MARICCHIO, a town of Naples, in the province of Bari; 19 miles S.S.W. of Conversano.

Pozzo Negro, a town on the E. coast of the island of Forteventura.

Pozzo Nuovo, a town of Naples, in Lavora; 9 miles N.W. of Naples.

Pozzo Rosso, a town of Naples, in the province of Bari; 9 miles S.W. of Andria.

POZZOLANA, or PUZZOLANA, in *Natural History*, a kind of substance formed of volcanic ashes, more or less compacted together, and so called from Pozzuolo, and pulvis Puteolanus, from Puteoli, situated near mount Vesuvius, from which these ashes are ejected, and in the vicinity of which it abounds. It occurs of various colours, white, red, or black, reddish or reddish-brown, grey or greyish-black; that of Naples is generally grey; that of Civita Vecchia is more generally reddish or reddish-brown. The red variety is the proper puzzolana; the black and the white sorts are called in Italy "lapillo," or "rapillo." The ashes which overwhelmed Pompeii now form an immense bed of white puzzolana. The surface of this substance is rough, uneven, and of a baked appearance. It comes to us in pieces, from the size of a nut to that of an egg. It is wholly destitute of internal lustre and transparency. It is easily frangible, and its fracture is uneven or earthy, and porous; commonly filled with particles of pumice, quartz, scoriae, &c. Hardness, 3. Very brittle. Sp. gravity from 2.570, which is that of the black, to 2.785, rarely 2.8. Its smell is earthy. It is not diffusible in cold water; but in boiling water it gradually deposits a fine earth. It does not effervesce with acids. Heated, it assumes a darker colour, and easily melts into a black slag, or with borax into a yellowish-green glass. Before it is heated, it is magnetic, but not afterwards. By Mr. Bergman's analysis, it contains from 55 to 60 *per cent.* of siliceous, 19 to 20 of argillaceous earth, 5 or 6 of calcareous earth, and from 15 to 20 of iron. When mixed with a small proportion of lime it quickly hardens; and this induration takes place even under water. This singular property proceeds, as Mr. Kirwan supposes, from the magnetic state of the iron it contains; for this iron, being unoxxygenated, subtilly divided, and dispersed through the whole mass, and thus offering a large surface, quickly decomposes the water with which it is mixed, when made into mortar, and forms a hard substance analogous to the specular iron ore, as it does in the iron tubes, in which water is decomposed, in the experiments of M. Lavoisier and Dr. Priestley; for in these the iron swells and increases in bulk; and so does puzzolana, when formed into mortar, as we learn from Higgins on "Cements." One principal use of lime seems to be to heat the water, as while it is hot, it cannot pervade the caked argill that invests the ferruginous particles; yet in time even cold water may pervade it, and produce hardness; and hence, as M. Dolomieu has observed, lavas become harder when moistened. If the mortar be long exposed to the atmosphere, fixed air, as well as pure air, will unite to the iron, rust will be produced, and the mortar will not then harden, as Dr. Higgins has noticed. Clay, over which lava has flowed, is frequently converted into puzzolana; but volcanic scoriae never afford it; either because they are much calcined, or retain sulphur, or its acid. (Kirwan.)

Price of 14lb. is 26s. What is the price of 7lb?

$$\begin{array}{r} 7 \overline{) 22} \\ \underline{14} \\ 8 \end{array}$$

facit 13s.

2. If the first term be 1, and the second an aliquot part of a pound, shilling, or penny, divide the third by the aliquot part: the quotient is the answer.

Note, To find the aliquot part, those who cannot do it otherwise, may see the table of aliquot parts of a pound, under the article ALIQUOT.

E. gr. If one ell cost 10s. What cost 957 ells?

facit 478l. 10s.

3. If the first or third number be 1, the other not exceeding large, and the middle term a compound, i. e. consisting of several denominations, it may be wrought without reduction, thus:

Price of 1lb. is 3s. 8d. 3q. What is the price of 5lb?

$$\begin{array}{r} 3 \text{ s. } 8 \text{ d. } 3 \text{ q.} \\ \times 5 \\ \hline 15 \text{ s. } 7 \text{ d. } 3 \text{ q.} \end{array}$$

For four farthings making a penny, five times three farthings make 3d. 3q., and twelve-pence making 1s., five times eight-pence make 3s. 4d., which, with 3d. from the place of farthings, makes 3s. 7d. Lastly, five times three shillings make 15s., and with the three shillings from the place of pence, 18s. The price required, therefore, is 18s. 7 $\frac{3}{4}$ d.

4. If the middle term be not an aliquot, but an aliquant part, resolve the aliquant part into its aliquot parts, divide the middle term by the several aliquots; the sum of the quotients is the answer. To find the aliquot parts contained in an aliquant, see the table of aliquant parts of a pound, under the article ALIQUANT.

For an instance of this rule.

If 1 ell cost 15s. What cost 124 ells?

$$\begin{array}{r} 15 \text{ s.} \\ \times 124 \\ \hline 180 \text{ s.} \\ 60 \text{ s.} \\ 60 \text{ s.} \\ \hline 1860 \text{ s.} \end{array}$$

facit. 93l.

5. If the first or second term be 1, and in the former case, the second or third, in the latter the first, be resolvable into factors, the whole operation may be performed in the mind, without writing down any figures; as in the following example:

Price of 1lb. is 24s. What is the price of 20lb?

$$\begin{array}{r} 24 \text{ s.} \\ \times 20 \\ \hline 480 \text{ s.} \end{array}$$

facit 480s.—24l.

6. Where one of the given numbers is 1, we have several compendious usages to save multiplication and division.

E. gr. If 9lb. cost 20s. What does 1lb. cost?

It is obvious the sum required is had by adding to the tenth part of 20s. viz. 2s. the ninth part of the tenth, viz. 2 $\frac{1}{2}$ d., and $\frac{2}{3}$ of a penny; the answer, therefore, is 2s. 2 $\frac{1}{2}$ d. and $\frac{2}{3}$.

Again, if 5lb. cost 64s. What costs 1lb.?

Since 5 is half of 10, the double of the tenth part of the given price, viz. 12s. 9 $\frac{1}{2}$ d. and $\frac{2}{3}$ q. is the sum required.

Again, if 1lb. cost 18d. What will 19lb. cost?

Since 19 = 20 - 1, from the given price doubled, and increased by a cipher, viz. 360; subtract the simple 18; the remainder is 342d. = 28s. 6d. the sum required.

7. If two terms of the same denomination differ by an unit, we have a peculiar kind of compend; which will be clear from the following examples: e. gr. if 5lb. cost 30s. What will 4lb. cost? Since the price of 4lb. is one-fifth

part short of that of 5lb. divide the given price 30, by 5; the quotient 6 being subtracted from the dividend, the remainder, viz. 24s. is the sum required.

Again, if 8lb. cost 24s. What cost 9lb.?

Since the price of 9lb. exceeds that of eight by one-eighth part, divide the given price 24, by 8, and add the quotient 3 to the dividend: the sum 27 is the answer.

8. Sometimes one may use several of these compends, or practices, in the same question. E. gr. If 100lb. cost 30s. 4d. What cost 50lb.

$$\begin{array}{r} 30 \text{ s. } 4 \text{ d.} \\ \times 50 \\ \hline 1500 \text{ s. } 20 \text{ d.} \end{array}$$

Again, 60lb. cost 4s. What cost 2520?

6	42
—	—
24	6
7	7
—	—
168l.	

PRACTORES, Πρακτορες, among the Athenians, officers appointed to receive the money due to the city from fines laid upon criminals.

PRADA, in Geography, a town of Italy, in the department of Amona; five miles N. of Faenza.—Also, a town of Italy, in the department of the Serio; seven miles N.E. of Bergamo.

PRADAKSHNA, in Mythology, a reverential ceremony, so called by the Hindoos, purporting a circumambulation. It is performed by keeping with closed palms the right hand toward the honoured object, and the face inclined that way. A pupil in this manner occasionally salutes his guru, or spiritual preceptor, or his parents, by several times thus walking slowly round them. It is not unusual to see Brahmans and others circumambulating a temple, or a tree, especially of that species called in Europe the Ficus religiosa, in India pipala. Sometimes this is done with the right hand in a bag, holding a rosary. It is thought to aid abstract contemplation, and is performed in silence, and called Jap. (See that article.) Females also frequently perform this ceremony of pradakshna around a tree, or a linga; the latter especially, if it be in view to offspring, by propitiating a generative deity. (See PARTHA.) It is in the latter cases continued for a considerable time, an hour perhaps, or more, usually at dawn of day, with a quickened pace, and frequently. Certain prayers are mentally recited during the ceremony. It is common to see one of the above-mentioned trees majestically spreading its arms over the roof of an extremely neat and clean house of a Brahman. Around the stem, for two or three yards each way, a mound of earth is often raised three or four feet, with perpendicular sides of brick or stone. This forms a terrace, on which perhaps is placed a linga (see LINGA), or an image, or shrub, according to the sect of the individual. The terrace is frequently smeared over with cow-dung, thinned with water to the consistency of paint, which is a very cool and cleanly application, and keeps away fleas and other insects. Mats or carpets spread on the terrace afford seats for reading or contemplation, or repose. To keep this place neat and in proper order is the province of the females of the family, who at day-break decorate the linga, &c. with chaplets of flowers, water the holy shrub, &c., or perform the pradakshna at the foot of the terrace, around which a path is usually made, and kept very clean, like the top of the terrace, which is called chabutra.

PRADANOZ, in Geography, a town of Spain, in the province of Leon; 60 miles E. of Leon.

PRADELLES, a town of France, in the department of the Upper Loire, and chief place of a canton, in the district of Le Puy; 17 miles S. of Le Puy. The place contains 1197, and the canton 6508 inhabitants, on a territory of 240 kilometres, in 15 communes.

PRADES, a town of France, and principal place of a district, in the department of the Eastern Pyrenées, situated on the river Tet; 23 miles W.S.W. of Perpignan. The place contains 2332, and the canton 10,184 inhabitants, on a territory of 295 kilometres, in 23 communes. N. lat. 42° 37'. E. long. 2° 30'.—Also, a town of Spain, in the province of Catalonia, near which is a magnificent abbey, where the ancient kings of Aragon were interred; 12 miles N.W. of Manresa.

PRADO, a town of Portugal, in the province of Entre Duero e Minho; 2 miles N.W. of Braga.—Also, a town of Spain, in Asturia; 32 miles N.E. of Oviedo.

PRADO, *El*, a town of Spain, in New Castile; 27 miles W.S.W. of Madrid.

PRADYAMNA, in *Mythology*, is an avatara or incarnation of Kama, the Hindoo cupid. (See KAMA.) Among a people so addicted to poetry as the Hindoos, we may reasonably expect a great deal of embellishment and extravagance in the amatory line. Such expectations are fully realized by an examination of their writings. The pretty fable of the god of love being reduced from a corporeal form to a mental essence by a flash of fire from Siva's central eye, is very often alluded to. Kama met this fate in punishment of his presumption for wounding the angry god with one of his flowery arrows: but relenting, on the intercession of Parvati, he consoled the afflicted Reti, widow of Kama, in the assurance that she should regain her husband, when he should be born again on earth, as Pradyamna, son of Krishna. (See KRISHNA.) Reti meanwhile was reduced to menial servitude with a tyrant or demon, named Sambara, and her lamentations on her wretched fate fill a whole book in a poem, called the Birth of Kumara, by Kalidas, the author of Sakoontala. The promise of Siva was in due time fulfilled. Pradyamna, soon after his birth, was seized by the tyrant, put in a chest and thrown into the sea, where it was swallowed by a fish, which was caught and purveyed for his table. It fell to the lot of Reti to open the fish, and finding the chest and its contents, she nurtured the infant in private, and educated him, until he had attained maturity, and strength to destroy the malignant Sambara. The youth had before considered Reti as his mother; but their minds being now irradiated, (their *maya* or delusion being dispelled, see MAYA,) the prophetic promise of Mahadeva was remembered, and the god of love was reunited to the goddess of pleasure.

PRÆ, a Latin preposition, literally signifying *before*; it is used in composition with several words in our language, to denote the relation of priority.

Of late, our writers, in Latin words anglicised, for *præ*, usually write *pre*; restraining the Latin orthography to words that are still Latin, or used as such. Hence, for such words beginning with *præ*, as are not found here, see PRE.

PRÆBIUM, a name used by medical authors to express a dose of any thing, or the quantity of medicine to be exhibited at one time.

PRÆCIÆ, among the Romans, the same with *Præclamitatores*; which see.

PRÆCIPE, in *Law*. See PRECIPE.

PRÆCIPE in *capite*, a writ issuing out of the chancery, for a tenant holding of the king in *capite*; viz. in chief, as of his crown.

PRÆCLAMITATOIRES, among the Romans, officers that went along the streets of Rome before the *flamen dialis*, to oblige all people to give over their work on public holidays; for if the flamen saw any one at work, the service of the gods could not be performed.

PRÆCLAVIUM, among the Romans, was used to signify the pretexta.

PRÆCO, among the Romans, the public crier, an officer whose business it was in the assemblies of the people to call the classes and centuries according to their order, and to order silence to be kept in the temples during the time of sacrificing.

The assistance of the *præco*, or public crier, was used on many other occasions, as at public sales or auctions, funerals, games, in courts of justice, or public things lost, &c. See CERYX.

PRÆCOCIA MALA, in *Botany*. See APRICOT.

PRÆCONISSUS, in *Natural History*, the name given by Ludovicus Dulcis, and other writers of his time, to a gem famous for its imaginary virtues: it is described to have been of the nature of the sapphire, but somewhat approaching to the colour of the chalcedony: this seems to make it the leucosapphirus of other authors.

PRÆCORDIA, in *Anatomy*. See PRECORDIA.

PRÆFECTURÆ, among the Romans. See PREFECTURES.

PRÆFERICULUM, among the Romans, a vase with a large prominent mouth, used in the sacrifices of Ops.

PRÆFERNIUM, a word used by chemical writers to express the anterior part of a furnace, by which the coals, or fuel are put in, and the ashes taken out.

PRÆFICÆ, among the Romans, were mourning women hired to attend funeral solemnities; where they praised the deceased, made a lamentation, beat their breasts, and distorted their faces, to excite others to mourn.

PRÆFINE, or PRIMER *Fine*, in *Law*, that fine which upon suing out the writ of covenant on levying *fines of lands*, is paid before the time is past. This is a noble for every five marks of land sued for, *i. e.* one-tenth of the annual value. See POST-fine.

PRÆLUDIUM, Lat. See PRELUDE.

PRÆMIUM. See PREMIUM.

PRÆMORSUS, in *Botany*. See RADIX and ROOT.

PRÆNOTION, is used by lord Bacon for breaking of an endless search, which he observes to be one of the principal parts of the art of memory. For when one endeavours to call any thing to mind, without some *previous notion* or perception of what is sought for, the mind exerts itself and strives in an endless manner: but if it hath any short notion before hand, the infinity of the search is presently cut off, and the mind hunts nearer home, as in an inclosure. Thus verse is easier remembered than prose; because if we stick at any word in a verse, we have a *previous notion* that it is such a word as must stand in a verse. Hence also, order is a manifest help to memory; for here is a *previous notion* that the thing sought for must be agreeable to order. Bacon's Works Abr. vol. i. p. 136. and vol. ii. p. 473. See PRENOTION, and Common NOTIONS.

PRÆPOSITUS *Sacri Cubiculi*, among the Romans, an officer who was to take care of the emperor's bed-chamber. His office was the same with that of our lord chamberlain, and he had the privilege of marching next to the captain of the horse-guards.

PRÆSALTOR, among the Romans, an appellation given to the chief director of the *salii*.

PRÆSEPIA, a word used by authors to express the sockets of the teeth.

PRÆSICIA, in *Antiquity*, those parts of the intrails of sacrifices which were cut off, and offered to the gods.

PRÆSUL, among the Romans, the name of a chief of the salii, or priests of Mars. He was so called a *præsiliendo*; i. e. dancing at the head of the salii.

PRÆTORIUS, MICHAEL, in *Biography*, an ecclesiastic in the Romish church, born at Creutzberg, in Thuringia; and one of the most voluminous writers on music, and composers, in Germany. In 1596, he was the forty-eighth of fifty-three organists appointed to examine the organ newly erected in the castle church at Groningen, in North Holland. His great theoretical work was entitled "Syn-tagma Musicum," which was designed to be extended to four vols. quarto; but he only published three. They contain a kind of history of the progress of ecclesiastical music, from its beginning to the author's own time. Walther has given the contents of each chapter of the three volumes; in which we find that the author had not confined his enquiries to *ecclesiastical* music, but of *secular* music gives the names of the fancied inventors of instruments and melodies; not forgetting the medicinal, or miraculous powers of the music of the ancients.

We fancy the work was not received by the public in a manner which the author expected. In the dedication of the first volume the author complains of his fatigues and trouble, and never published the fourth.

Many of his compositions have fallen into our hands, which having scored, we found to be dry, and totally devoid of genius, though correct in harmony. If ever they may be said to have lived, they have been so long plunged in Lethe, as to be now dead beyond all the power of resuscitation.

PRAG, in *Geography*, a town of the duchy of Wurzburg; 3 miles N. of Kissingen.

PRAGA, or PRAGUE, a town of the duchy of Warsaw, on the Vistula, which separates it from Warsaw, of which it is the fauxbourg.

PRAGELAS, a town of France, in the department of the Po, ceded by France to the king of Sardinia, at the peace of Utrecht; 9 miles from Susa.

PRAGERHOF, a town of the duchy of Stiria; 4 miles E. of Windisch Weifritz.

PRAGMATIC SANCTION, in the *Civil Law*, is defined, by Hottoman, a rescript, or answer of the sovereign; delivered, by advice of his council, to some college, order, or body of people, upon their consulting him in some case of their community.

The word is formed from the Greek *πραγμα*, *negotium*, *business*. It is sometimes also called absolutely, *pragmatic*, το *πραγματικον*.

The like answer given to any particular person, is called simply *rescript*, *rescriptum*.

The term pragmatic sanction is chiefly used, among the modern writers, for that famous ordonnance of Charles VII. of France, drawn up at Bourges, with the consent of the most eminent prelates and grandees of the nation assembled at that place, and published in 1438, containing a regulation of ecclesiastical discipline, conformable to the canons of the council of Basil; and since used by the Gallican church, as a barrier against the enterprizes and encroachments of the court of Rome.

The scope of the pragmatic sanction, which consisted of twenty-three articles, was to regulate the form of elections made by the clergy, to restore to every church its privilege of choosing its bishop, and to every monastery that of electing its abbot or crier; to declare the collations to belong to ordinaries, the prevention alone reserved to establish pre-

bends; to assign a third of the benefices to graduates; and to abolish reservations, annates, and other like grievances.

The pragmatic of St. Lewis in 1268, consisting of six articles, was similar to this in its chief design. The edict of Bourges, in 1438, was drawn up in concert with the fathers of the council of Basil, and the articles it contains were taken from the decrees of that council; though they were admitted by the Gallican church with certain modifications, which the nature of the times and the manners of the nation rendered expedient. See this edict published at large in Hard. Concil. tom. viii. p. 1949.

Pope Pius II. obtained an abrogation of this sanction from Louis XI., on which occasion the court of Rome, transported with joy, dragged the pragmatic through the streets, whipping it all the way, as Xerxes anciently did the Hellepont: and the king obtained for himself and his successors the title of *Most Christian*.

But the parliament opposed this abrogation with a great deal of vigour, and refused its consent to the last. Lewis also perceiving that he had been deluded into this measure by the treacherous insinuations of Geoffroy, bishop of Arras, whom the pope had bribed with a cardinal's cap, and large promises of a more lucrative kind, took no sort of pains to have it executed, but published, on the contrary, new edicts against the pecuniary pretensions and extortions of the court of Rome. So that, in spite of all the efforts of Rome, the sanction still held in force, till the concordat held between pope Leo X. and Francis I. in 1517, when the pragmatic sanction was abolished, and the king was invested with the privilege of nominating to bishoprics and vacant benefices.

The parliament of Paris again opposed the innovation, and refused to confirm the concordat; and was not brought to give its consent at last, till after repeated orders of the king; together with a secret resolution taken always to judge conformably to the tenor of the pragmatic sanction.

PRAGMATICAL, PRAGMATICUS, a term sometimes used in the same sense as *practical*, *mechanical*, or *problematical*.

Stevinus, in his *Hydrostatical Elements*, calls certain of his mechanical or practical experiments, which he undertakes to instruct his reader how to make, by the name of pragmatical examples: and, in the like sense, is the word sometimes used by other naturalists.

PRAGSTAAL, in *Geography*, a town of Austria; 9 miles S. of Grein.

PRAGUE, a city and capital of Bohemia, situated in the circle of Schlan, and almost in the centre of the kingdom. Its fortifications are of little importance; its houses, generally of three stories, are built of stone; it has broader streets, though fewer stately palaces, than Vienna. The number of its churches and chapels is reckoned to be 92, and it has about 40 cloisters. The population of Prague is not duly proportioned to its extent, as it contains only about 79,500 Christians, 9000 Jews, and 8000 in garrison; nor is its commerce considerable, and its inhabitants chiefly subsist on the brewing of beer, independently of some few arts and handicraft trades. Prague consists properly of three towns, each of which has its peculiar magistrate; viz. the Old and New Towns, lying the E. side of the Mulda, and Small-side, on the W. side of that river. The Old Town, less ancient than that called Small-side, but older than the New Town, was first founded in the year 795, and from its ancient citadel called "Wichtered," and the "Great Town" by way of distinction from the lesser Side or Town. The New Town, or "Neustadt," was founded by Charles IV. in the year 1348, and called "Karlow" or "Karl-

“Karlstadt,” having the same privileges with the Old Town. This surrounds the Old Town for a considerable compass, and has broad and straight streets, with 2500 houses. The Small-side, or Lesser Town, is united with the preceding by a stone bridge, erected over the Mulda, and being the oldest, first bore the name of Prague. Prague is the see of an archbishopric. It is besides our purpose to recount the contests in which for several centuries it has taken part. Without the Strahov gate, at no great distance from the city, is situated the eminence, called the “White Mountain,” and rendered remarkable by the battle fought there in 1620, which terminated unhappily on the side of the Palgrave, and crowned Frederick king of Bohemia. Prague has an university, which was founded in 1347. N. lat. 50° 5'. E. long. 13° 28'.

PRAGWALD, a town of the duchy of Stiria; 6 miles W. of Cilley.

PRAHEC, a town of France, in the department of the Two Sevres, and chief place of a canton, in the district of Niort; 6 miles S.E. of Niort. The place contains 744, and the canton 4900 inhabitants, on a territory of 162½ kilometres, in 9 communes.

PRAIRIE *de Rocher, La*, or *the Rock Meadow*, a settlement in the Indiana territory, on the E. side of the Mississippi, on a stream which enters into this river, 12 miles to the S., 15 miles N.W. of Kaskaskias village, and 5 N.E. by E. of fort Chartres. Between 30 and 40 years ago it contained 100 white inhabitants, and 80 negroes.

PRAIRIE, *La*, a populous though small village, with narrow dirty streets, on the river St. Lawrence in Canada; 18 miles N. of St. John. N. lat. 45° 32'. W. long. 73° 15'.

PRAISSAS, a town of France, in the department of the Lot and Garonne; 10 miles S.E. of Tonneins.

PRAKRITI, in *Hindoo Mythology*, is a personification of crude nature, or chaos. It is detailed at great length in the Hindoo theogonies how the divine being, after creating the trimurti, proceeded to the formation of Prakriti, who under different forms and names is the consort of the triad or trimurti. 1. As Saraswati, she is the consort of Brahma, the patroness of learning, the goddess of eloquence, and inventress of the lyre. 2. As Sri, or Lakshmi, she is the beloved of Vishnu, the goddess of abundance and fertility. 3. As Isi or Parvati, she is the companion of Ishwara, and the vanquisher of the giants. These were produced by the volition of the deity. In the Sri Purana it is added, that with Prakriti, a male being called Parusha was created. Prakriti is described as of perfect beauty, with eight arms. They are afterwards called Narayana and Narayani, whence proceeded the elements of created nature, earth, fire, water, &c. From the navel of Narayana a lotus issued, bearing Brahma in its calyx; and from Narayani sprung Vishnu, and Lakshmi and Parvati, and Savitri; the latter a name of the sun; but here apparently the same as Saraswati. We shall here, however, enter no farther on these fables, which require a lengthened and connected detail to render them at all consistent or comprehensible. A reference to the several articles in this work, under the names mentioned above, may perhaps furnish a clue to some of the natural phenomena veiled in these allegories.

PRAM, or PRAME, a sort of lighter used in Holland and the ports of the Baltic sea, to carry the cargo of a merchant ship along-side, in order to lade her, or bring it ashore.

PRAMNION, in *Natural History*, the name of one of the semipellucid gems, so distinct from all the others as to make properly a peculiar genus of fossils. It is called by

many of the ancients *morio* or *morion*, and by our lapidaries the *black agate*.

It is a stone of a very great concealed beauty. Our lapidaries, who know it by the name of the black agate, are very indeterminate in the application of that name, calling not only this, but every black stone capable of a good polish, by the same name, and never looking for its great character, its hidden colour. It is found in the shape of our common flints and pebbles, but seldom larger than an egg; it appears, on a slight inspection, to be of a fine deep black, but held up against the sun, or the light of a candle, it discovers itself to be of a fine strong red, without the least admixture of any other colour. It is most frequently of a purplish tinge, like the amethyst, but is at times found of all the degrees of red, from the pale flower colour of the hyacinth to the deep red of the carbuncle. It is of great hardness, and capable of an elegant polish.

It is produced only in the East Indies; and we sometimes have it thence among other stones, but it is not much regarded with us. The Romans were fond of it for engraving on, as we find by Pliny, and by a much more undeniable proof, many of the valuable antiques being cut on it.

PRAMNOS, a name given by the ancients to a sort of austere wine, which looked of a black colour till held up against the light, and then appeared of a deep purple: it is recommended by Hippocrates in hæmorrhages.

PRAMPAM, in *Geography*, a town of Africa, on the Gold Coast. N. lat. 5° 50'. W. long. 0° 45'.

PRANDNETZ, a town of Prussia, in the palatinate of Culm; nine miles E. of Thorn.

PRANSAGUR, a town of Bengal; 10 miles S. of Dinagepour.

PRAPREDSHOFF, a town of the duchy of Carniola; three miles W.N.W. of Weixelburg.

PRASE, in *Mineralogy*. See QUARTZ, GEMS, and PRASIUS.

PRASINIZZA, in *Geography*, a town of Istria; 14 miles N.N.E. of Pedena.

PRASINUM VIRIDE, a word used by the ancients for verdigris.

PRASION. The ancient Greek writers have expressed three very different plants by this name.

The most common signification of the word is the common *marrubium*, or horehound. It is in many places used also to signify the leek, and often for that sort of marjoram which we call *origanum onitis*, or pot-marjoram. Pliny describes this plant, and says that it was called *onitis* and *prasius*, and had the appearance of hyssop.

Hesychius tells us, that the sea-weeds of the fucus and alga kinds, the sea-oaks, and sea-wracks, are called by some of the Greek writers *prasia*; and Theophrastus in one part of his works seems to have given this name to those substances.

The ancients having used the word *prasion* in this sense, explains a passage in Galen which cannot otherwise be well understood, that is, where he calls the *empetrum marinum*, *prasioides*, like the *prasion*.

Dioscorides had called it *fucoides*, like the sea-fucus, and he was very well understood; but Galen coming after him, and expressing his sense by the word *prasioides*, which was supposed to signify resembling leeks, or horehound, or origanum, his readers were perplexed to find out what alliance the epithet he had chosen to use could have, either to the plant, or to the epithet of Dioscorides; but when it is found that *prasion* signifies the same as *fucus*, the whole is very intelligible.

PRASIS, a word used by some authors to express what they call green chalk, an earth used by the painters, and known among us by the name of the *terre verte*.

PRASIUM, in *Botany*, a name adopted from Dioscorides, though there is little probability of his *πρασινον* being our plant, except so far as it is reported to have some affinity to Horehound or to Marjoram, and our's is a ringent flower, found wild in Greece and other parts of the south of Europe. Linn. Gen. 302. Schreb. 398. Willd. Sp. Pl. v. 3. 179. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. Juss. 117. Lamarck Illustr. t. 516. Gærtn. t. 66.—Class and order, *Didynamia Gymnospermia*. Nat. Ord. *Verticillatae*, Linn. *Labiatae*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, turbinate, erect, two-lipped; upper lip broadest, divided half way down into three acute segments; lower rather smaller, cloven. *Cor.* of one petal, ringent; its upper lip erect, ovate, concave, slightly emarginate; lower broadest, three-cleft, reflexed, the middle segment largest. *Stam.* Filaments four, awl-shaped, rather distant, pressed close to the upper lip, but not so long, two of them shorter than the others; anthers oblong, lateral. *Pist.* Germen four-cleft; style thread-shaped, agreeing with the stamens in length and situation; stigma in two acute segments, one of which is shorter than the other. *Peric.* Seeds four, roundish, in the bottom of the calyx, each pulpy under the skin.

Ess. Ch. Seeds four, with a pulpy coat.

1. *P. majus*. Great Spanish Hedge-nettle. Linn. Sp. Pl. 838. Willd. n. 1. Ait. n. 1. Sm. Fl. Græc. Sibth. t. 584, unpublished. (*Teucrium fruticosum*, amplex. et albo flore, italicum; Barrel. Ic. t. 895.)—Leaves ovate-oblong, serrated.—Native of Italy, Sicily, Barbary, and the Levant. It flowers in our greenhouses from the early spring to the end of summer, and is easily kept, as well as propagated by cuttings without difficulty, but there is nothing in its appearance to excite popular admiration. The stem is shrubby, branched and spreading. Leaves on short stalks, opposite, smooth, dark-green, an inch or more in length. Flowers axillary, solitary, opposite, white, spotted in the mouth with purple. Fruit dark violet, juicy, like four berries, some of which are often abortive.

2. *P. minus*. Small Sicilian Hedge-nettle. Linn. Sp. Pl. 838. Willd. n. 2. Ait. n. 2.—Leaves ovate, with two notches at each side.—Native of Sicily, where it was noticed by Cupani. This species finds a place in Mr. Aiton's work, but seems to be no where figured, nor is it supposed to be more than a small variety of the foregoing, with fewer notches in the leaves. Cupani's description of the flowers betrays no distinction whatever. Linnæus however seems to have, at some time or other, confounded another plant with this, but not perhaps in any of his descriptions.

The *P. majus* bears the name of *φάσσοχορτον* among the modern inhabitants of Zante; which from its resemblance to *πρασινον*, softened, as usual in modern Greek, at the beginning of the word, and combined with *χορτον*, a plant, countenances the Linnæan adaptation of the generic name.

PRASIUM, in *Gardening*, contains plants of the low, shrubby, exotic, evergreen kinds, of which the species cultivated are, the great Spanish hedge-nettle (*P. majus*); and the small hedge-nettle (*P. minus*).

Method of Culture.—These plants may be increased by seeds and cuttings.

The seeds should be sown on a bed of light mould, in the early spring season, as about April, the plants being afterwards kept clear from weeds, and placed in the situations

where they are to remain, or in pots, to be gradually hardened as they advance in growth.

The cuttings should be taken from such plants as are strong, and where the shoots are short and good, and if a joint of the former year's wood be taken to each of them, they succeed better. They should be planted out either in a shady border or in pots in the latter part of the spring season, as about the end of April. When the plants have stricken good root in the borders, they should be removed into the situations where they are to remain, and those in pots into separate ones. Those in pots should be placed under a frame during the winter, or in the greenhouse, where they can have plenty of free air when the season is dry. They only require to be screened from severe frosts. When planted in the open ground they should have a dry poor soil and sheltered situation. These plants afford much ornament in the greenhouse collections, and among other evergreen shrubs of the more hardy kinds.

PRASIUS, in *Natural History*, the name of a gem much approaching to the nature of the emerald, but of a coarser green, and wanting its hardness, and having in its green a cast of yellow.

It is the stone which the ancients called *prasites*; and when of a greater than ordinary admixture of yellow, the *chryso-prasus*, and of which the gem distinguished by later authors under the name of *smaragdoprasus*, is only one of the varieties.

The prasus, even in its most perfect state, is much less beautiful than most of the other gems: it is found of various sizes, and not unfrequently considerably large: it is seldom met with smaller than a pea; from that to the size of a horse-bean is its more usual standard, from this to the size of a nutmeg it is more rarely found; and the larger specimens are coarser and less frequent than these. It is of various figures, but is never found in a columnar or crystal-like form; this is declaring against the sense of our dealers in gems, indeed, who frequently buy and sell columns of the shape of sprig crystals, under the name of the *smaragdoprasus*; but these are all truly no other than crystals tinged to a coarse and dead green, and without any mixture of yellow; so that they are more properly *pseudosmaragdi*, or bastard emeralds, than any thing of the prasus kind. See GEMS and QUARTZ.

PRASLAUKEN, in *Geography*, a town of Prussian Lithuania, on the Rominte; eight miles S.S.E. of Gum-binnen.

PRASLIN, an island in the Indian sea, lofty, mountainous, and covered with trees. Mr. Lewis, commander of the Eagle, one of the Hon. East India Company's cruisers from Bombay, landed here in the year 1771, and found a flag-staff erected by the French on a rock, but the flag was blown away; the arms of the king of France were cut on a sheet of lead, and set in a small place built of brick and mortar, in token of possession, with the date 1768. Port Praslin, on the N. side of the lands of the Arsacides, (see ARSACIDES,) in S. lat. 70° 25'. E. long. from Paris 155° 32', was discovered and entered by M. de Surville, Oct. 12, 1769. The inhabitants of the islands that form this port are represented as being generally of the Negro kind, with black woolly hair, flat noses, and thick lips. Mr. Lewis found on the island which he visited plenty of cocoa-nut trees, and land-tortoises, but neither tents nor appearance of inhabitants. The harbour seemed to be a good one, and well sheltered by small islands from all winds.

PRASLIN, a town of France, in the department of the Aube; nine miles S.W. of Bar-sur-Seine.

PRASONISI, a small island near the N.E. coast of the island of Samos.—Also, two rocky islets in the Grecian Archipelago, near the S. coast of Myconi.

PRASOPHYLLUM, in *Botany*, from *πρασον*, a leek, and *φυλλον*, a leaf, because of the tubular and tapering form of the solitary leaf in every known species, resembling the foliage of a leek. Brown Prodr. Nov. Holl. v. 1. 317.—Class and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*.

Ess. Ch. Calyx ringent; upper leaf in front, vaulted. Petals inequilateral. Lip ascending, undivided, stalked, without a spur. Column deeply divided; its lateral segments membranous. Anther in front, parallel to the stigma, permanent, with approximated cells. Masses of pollen two in each cell, powdery, attached by their points to the stigma.

This genus is said by its author to be very nearly akin to *Cranichis*, as well as to *Genoplesium*. He describes twelve species, natives of the east and south parts of New Holland; all smooth herbaceous plants, growing on the ground. Their *bulbs* are undivided. *Stem* bearing one or two short sheathing scales and one *leaf*, but no *bractæas*. The *leaf* is cylindrical, tubular, sometimes short, with a very long sheathing base. *Flowers* spiked, among the smallest of this tribe, of various colours. Some have the lateral segments of the *column*, which Mr. Brown regards as abortive filaments, entire at the summit; others have those parts cloven. In the former case the *anther* is without a point; in the latter it has a sort of beak. All the species were seen by this acute botanist in a living state, and appear to have been described by no other writer.

PRASTGRUMDET, in *Geography*, a small island on the W. side of the gulf of Bothnia. N. lat. $61^{\circ} 21'$. E. long. $17^{\circ} 10'$.

PRASTOE, or **PRÆSTOE**, a sea-port of Denmark, with a good harbour in a bay of the Baltic, on the S.E. coast of the island of Zealand; 35 miles S. of Copenhagen. N. lat. $55^{\circ} 10'$. E. long. $12^{\circ} 6'$.

PRESTERGADEN, a town of Sweden, in Warmeland; seven miles N.E. of Carlstadt.

PRAT, a town of France, in the department of the North Coasts; eight miles S.E. of Lanion.

PRATAS, a cluster of islands in the Chinese sea, arranged in a circular form, and about 60 miles in circumference. N. lat. $19^{\circ} 32'$. E. long. $116^{\circ} 43'$. One of these islands, called "Prata," is of considerable extent, being 18 miles from N. to S., according to captain King, but he was not able to ascertain its western limits. Its N.E. extremity was in N. lat. $20^{\circ} 58'$. E. long. 117° ; and its S.W. extremity in N. lat. $20^{\circ} 45'$. E. long. $115^{\circ} 44'$.

PRATENSIS, in *Biography*. See **JOSQUIN**.

PRATICA, in *Geography*, a town of Italy, in Campagna di Roma; eight miles S.W. of Albano.

PRATIQUE, or **PRATIC**, in *Commerce*, a negotiation, or communication of commerce, which a merchant-vessel obtains in the ports it arrives in, and the countries it discovers.

The word is French, and signifies, literally, *practice*.

Hence, to obtain pratique, is to obtain a liberty to frequent a port, to go ashore, to buy and sell, &c.

In the European ports of the Mediterranean sea, it implies a free commercial intercourse with the inhabitants of the country, after a limited quarantine has been performed, in consequence of a voyage to Barbary or Turkey.

PRATIQUE is particularly used for a licence to traffic, granted to the master of a ship in the ports of Italy, upon a

bill of health; that is, a certificate that the place whence he came is not annoyed with any infectious disease.

PRATO, in *Geography*, a town of Italy, in the department of the Serio; 10 miles E.N.E. of Bergamo.—Also, a town of Etruria; five miles N.E. of Florence.

PRATS de Mollo, a town of France, in the department of the Eastern Pyrenées, and chief place of a canton, in the district of Ceret; constructed in the form of an amphitheatre, irregularly fortified. In its vicinity are mines of copper mixed with silver; 12 miles W.S.W. of Ceret. The place contains 3190, and the canton 5954 inhabitants, on a territory of 285 kilometres, in five communes.

PRATS del Rey, a town of Spain, in Catalonia; nine miles W. of Manresa.

PRAVIS, a town of Spain, in Asturia, on a river of the same name.—Also, a river of Spain, which passes by Oviedo, &c. and runs into the sea; 10 miles N. from the town of Pravis.

PRAUL POINT, a cape of England, on the S. coast of Devonshire, in the English channel; five miles S.W. of Start Point.

PRAUSKA, a town of the duchy of Warsaw; 30 miles S. of Siradia.

PRAUSNI, **TEUTSCH**, a town of Bohemia, in the circle of Konigingratz; four miles S. of Trautenau.

PRAUSNITZ, or **PRAUSSIEC**, a town of Silesia, in the principality of Trachenberg; six miles S. of Trachenberg. N. lat. $51^{\circ} 21'$. E. long. $16^{\circ} 58'$.

PRAUST, a town of Pomerelia; seven miles S. of Dantzic.

PRAUTHOY, a town of France, in the department of the Upper Marne, and chief place of a canton, in the district of Langres. The place contains 654, and the canton 9232 inhabitants, on a territory of $272\frac{1}{2}$ kilometres, in 25 communes.

PRAWN. See **CANCER** and **SQUILLA**, family **PALÆMON**.

PRAXAGORAS, in *Biography*, a physician, born in the island of Cos, and the son of Nearchus. He was of the family of the Asclepiades, and one of the last of them who supported the medical reputation of the line. He was contemporary with Diocles. He studied anatomy assiduously by the dissection of brutes, and left some works on the subject, which are now lost, and of which Galen spoke with some contempt. Nevertheless, his reputation attracted the celebrated anatomists Philotimus, Plistonius, and Herophilus to his school. Some fragments of his medical doctrines, however, which are preserved by Cælius Aurelianus, seem to confirm the opinion which Galen maintained of his skill. See Le Clerc. Hist. de la Med.

PRAXEANS, in *Ecclesiastical History*, a sect of heretics, so called from their author, Praxeas.

This heresiarch was of Asia, and lived in the second century. He was at first a disciple of Montanus, but quitted him, and soon after set up a sect of his own; teaching, that there was no plurality of persons in the Godhead; and that it was the Father himself that suffered on the cross; which sentiment was afterwards adopted by the Monarchists, Sabellians, and Patripassians.

PRAXITELES, in *Biography*, a celebrated sculptor of antiquity, was born in Græcia Magna, and flourished about the year 364 B. C. He excelled particularly in the working of marble, and was the author of some of the most famous statues noticed by ancient writers; among these were two of Venus, one clothed and the other naked. The first was purchased by the Coans, who preferred it as the most decent.

decent. The Cnidians took the other, which was so exquisitely beautiful, that many persons took a voyage to the island for the sole purpose of seeing it. Praxiteles was deeply enamoured of the famous courtesan Phryne, of whom he made several statues, one of which was erected at Delphi. Many of his performances were in the Ceramicus at Athens, among the rest, the statues of Harmodius and Aristogiton, which Xerxes carried away, and Alexander afterwards restored. Many were extant at a later period in Rome. His most noted works were in marble, but he cast many statues in metal, which, as well as those of marble, were greatly admired. He had a son, Cephissodorus, who inherited his skill and fame.

PRAYA, in *Geography*. See PORTO-PRAYA.

PRAYA, a sea-port town of the island of Tercera, situated on a plain, near the gulf, defended by walls and bastions; containing a church, four convents, three hospitals, and about 3000 inhabitants.—Also, a town of the island of Gratiofa, one of the Azores.—Also, a town of Africa, on the Slave Coast, in the kingdom of Ardra, situated on the sea-coast, at the bottom of a bay; 32 miles N.E. of Grand Popo.

PRAYER, in *Theology*, denotes a serious and solemn address of our minds to the Deity, as the fountain of being and happiness, and the parent and governor of the world. The chief parts which it includes are, acknowledgment of our dependence, and of the divine perfections and sovereignty:—thankfulness for the mercies we have received:—a penitential confession of what we have done amiss:—and offering up our desires of favour and happiness for ourselves and others.

Divines distinguish three kinds of prayer:

Vocal, which is clothed in words and sounds to be uttered with the mouth. *Mental*, which is only formed or conceived in the mind, and not delivered in words. *Ejaculatory*, which is a short, sudden flight, without study, order, or method.

Mystic divines, again, distinguish prayer into *active* and *passive*.

Among us, prayer is most frequently considered under the divisions of *preconceived* and *extemporary*.

Under the first come all set forms, whether public or private, by which the mind is directed in the order, manner, expression, &c. of its petitions. See LITURGY.

The second is that where the mind is left to itself, its own conduct, both as to matter, manner, words, &c.

The Romanists also prefer prayers to saints; the Virgin, the angel Gabriel, &c.

We conceive that we shall not deviate from the general plan and design of this work, by availing ourselves of the opportunity that here occurs, of introducing some observations on the duty and efficacy of prayer, with brief replies to the more common objections that are urged against the obligation or utility of this duty.

It has been remarked in general, that it is the usual practice of mankind, when some of them wish to obtain any thing of others, to recur to intreaty. This universal practice must be natural; and it seems probable, says archdeacon Paley, that God, as our supreme governor, should expect that towards himself, which, by a natural impulse, or by the irresistible order of our constitution, he has prompted us to pay to every other being on whom we depend. The same observation is applicable to thanksgiving. Besides, it has been often said, and as generally acknowledged, that prayer is necessary to keep up in men's minds a sense of God's agency in the universe, and of their own dependence upon him. But after all, the duty of prayer depends upon its

efficacy; for it is not easy to conceive, how any man can pray, or be obliged to pray, who expects nothing from his prayers; but who is persuaded at the time when he utters his request, that it cannot produce the smallest impression upon the being to whom it is addressed, or advantage to himself. The efficacy of prayer imports, that we obtain something in consequence of praying, which we should not have received without prayer: against this expectation it has been objected, that if what we request be fit for us, we shall have it without praying; if it be not fit for us, we cannot obtain it by praying. The only reply to this objection is, that it may be agreeable to perfect wisdom to grant that to our prayers which it would not have been agreeable to the same wisdom to have given us without praying for. If it be asked, what virtue prayers possess, which should make a favour consistent with wisdom, that would not have been so without it? In reply to this question, Paley offers the following possibilities: 1. A favour granted to prayer may be more apt, on that very account, to produce good effects upon the person obliged, agreeably to the common maxim in relation to human benefits, that what is obtained without asking is frequently received without gratitude. 2. It may be consistent with the wisdom of the Deity, to withhold his favours till they be asked for, as an expedient to encourage devotion in his rational creation, in order thereby to keep up and circulate a knowledge and sense of their dependency upon him. 3. Prayer has a natural tendency to amend the petitioner himself; and thus to bring him within the rules, which the wisdom of the Deity has prescribed to the dispensation of his favours. If prayer be any thing more than a mere mechanical form, the regular, or even the frequent performance of it, cannot consist with the allowed and habitual practice of iniquity; agreeably to a trite, but true adage, a man must either leave off praying, or leave off sinning. Unless a person is made better by his prayers, they will not long be continued.

Paley concedes to the objection above stated, that prayer cannot reasonably be offered to God with the same view with which our intreaties are addressed to men, *viz.* to inform them of our wants or desires; to tease them out by importunity; to work upon their indolence or compassion, in order to persuade them to do what they ought to have done before, or ought not to do at all. This part of the argument is well illustrated by the author now cited, in the following manner: Suppose there existed a prince, who was known by his subjects to act, of his own accord, always and invariably for the best; the situation of a petitioner, who solicited a favour or pardon from such a prince, would sufficiently resemble ours; and the question with him, as with us, would be, whether, the character of the prince being considered, there remained any chance that he should obtain from him by prayer, what he would not have received without it. I do not conceive that the character of such a prince would necessarily exclude the effect of his subjects' prayers; for when that prince reflected, that the earnestness and humility of the supplication had generated in the suppliant a frame of mind, upon which the pardon or favour asked would produce a permanent and active sense of gratitude, that the granting of it to prayer would put others upon praying to him, and by that means preserve the love and submission of his subjects, upon which love and submission their own happiness, as well as his glory, depended; that beside that the memory of the particular kindness would be heightened and prolonged by the anxiety with which it had been sued for, prayer had in other respects so disposed and prepared the mind of the petitioner, as to render capable of future service, him who before was unqualified

unqualified for any :—might not that prince, I say, although he proceeded upon no other considerations than the strict rectitude and expediency of the measure, grant a favour or pardon to *this man*, which he did not grant to *another*, who was too proud, too lazy, or too busy, too indifferent whether he received it or not, or too insensible of the sovereign's absolute power to give or to withhold it, ever to ask for it ; or even to the *philosopher*, who, from an opinion of the fruitlessness of all addresses to a prince of the character which he had formed to himself, refused in his own example, and encouraged in others, all outward returns of gratitude, acknowledgments of duty, or application to the sovereign's mercy or bounty ; the disuse of which (seeing affections do not long subsist which are never expressed) was followed by a decay of loyalty and zeal among his subjects, and threatened to end in a forgetfulness of his rights, and a contempt of his authority ? These, together with other assignable considerations, and some perhaps inscrutable, and even inconceivable by the persons upon whom his will was to be exercised, might pass in the mind of the prince, and move his counsels ; whilst nothing, in the mean time, dwelt in the petitioner's thoughts but a sense of his own grief and wants ; of the power and goodness from which alone he was to look for relief ; and of his obligation to endeavour, by future obedience, to render that person propitious to his happiness, in whose hands, and at the disposal of whose mercy, he found himself to be."

Our author observes, that the objection to prayer supposes that a being perfectly wise must be necessarily inexorable, which supposition is altogether unwarrantable, as inexorability is not any part of perfect wisdom ; and it also assumes as a principle, that there is *one*, and only *one* mode of action *for the best*, and that the divine will is necessarily determined and confined to that mode ; both which positions presume a knowledge of universal nature, much beyond what we are capable of attaining.

Another evidence of the inefficacy of prayer is deduced from its want of the confirmation of experience. Concerning this appeal to experience, it will be sufficient to remark, that if prayer were suffered to disturb the order of second causes appointed in the universe too much, or to produce its effect with the same regularity that they do, it would introduce a change in human affairs, which, in some respects, will be evidently for the worse. If the efficacy of prayer were so constant and observable as to be relied upon *before hand*, the conduct of mankind would, in proportion to that reliance, become careless and disorderly. Men would depend upon their praying instead of labour for the supply of their wants, and recur to prayer for the restoration of their health, instead of moderating those passions, or abstaining from those pleasures, which in many cases are productive of disease. Upon the whole, we may observe, that our prayers may possibly, in many instances, be efficacious, and yet our experience of their efficacy be dubious and obscure. This obscurity and ambiguity may probably be necessary to the happiness and safety of human life.

Some persons, who would not wish altogether to exclude prayer, object to the mode of it that is often adopted, and to many of the subjects that form a part of public worship, or of private devotion. To pray for particular favours explicitly, is, as they say, to dictate to divine wisdom and goodness ; to intercede for others, especially for whole communities and empires, is still worse : because we thus presume that we have such an interest with the Deity, as to be able, by our applications, to bend the most important of his counsels, and that the happiness of others as individuals, or in the aggregate, is to depend upon this interest and our

choice. To this kind of objection it will be sufficient to reply, that our prayers for ourselves or others, as far as they concern ourselves and temporal interest, should be expressed with great humility and entire resignation to the divine will, and that under this limitation they are highly reasonable and proper ; and they are conformable to that general plan of providence, which renders one man the instrument of happiness or misery to another. "Why may we not be assisted by the prayers of other men, who are beholden for our support to their labour ? Why may not our happiness be made in some cases to depend upon the intercession, as it certainly does in many upon the good offices of our neighbours ? The happiness and misery of great numbers we see oftentimes at the disposal of one man's choice, or liable to be much affected by his conduct ; what greater difficulty is there in supposing, that the prayers of an individual may avert a calamity from multitudes, or be accepted to the benefit of whole communities ?"

If we recur to the authority of divine revelation, this will confirm the conjectures and deductions furnished by natural religion, and afford us direct and positive evidence of the efficacy of prayer. The scriptures not only affirm the propriety of prayer in general, but supply us with precepts or examples, which justify some topics and modes of prayer that have been thought exceptionable. Concerning the duty and efficacy of prayer in general, we may refer to Matt. vii. 7. 11. Luke, xxi. 36. Rom. xii. 12. Phil. iv. 6. 1 Theff. v. 17. 1 Tim. ii. 18. Examples of prayer for particular favours by name occur in 2 Cor. xii. 8. 1 Theff. iii. 10. Directions to pray for national or public blessings may be found in Psalm cxxii. 6. Zech. x. 1. 1 Tim. ii. 1, 2, 3. Examples of intercession, and exhortations to intercede for others, are recorded in Exod. xxxii. 11. Acts, xii. 5. Rom. i. 9. xv. 30. James, v. 16. Moreover, declarations and examples authorizing the repetition of unsuccessful prayers may be found in Luke, xviii. 1. Matt. xxvi. 44. 2 Cor. xii. 8.

The reformed churches of Christendom, adhering to their only infallible guide, have laid aside prayers for the dead ; because they are not authorized by any precept or precedent found in scripture. For the same reason they properly reject the invocation of saints ; and also because such invocations suppose in the saints whom they address a knowledge, which can perceive what passes in different regions of the earth at the same time : and they deem it too much to take it for granted, without the smallest intimation of such a thing in scripture, that any created being possesses a faculty little short of that omniscience and omnipresence which they ascribe to the Deity.

Private prayer, which is recommended by its own propriety, and by advantages not attainable in any form of religious communion, receives a superior sanction from the authority and example of Christ. Matt. vi. 6. xiv. 23.

The peculiar use of family prayer, as a branch of domestic piety, consists in its influence upon servants, and the young members of a family, who may be less disposed than others of maturer years and greater reflection to avail themselves of the exercise of private devotion, and whose attention is not so easily commanded in public worship.

The duty and advantages of public worship require a more distinct consideration, and a more ample discussion, for which we refer to PUBLIC WORSHIP. On the subject of this article, see Paley's Principles of Moral and Political Philosophy, vol. ii. ch. 2. Price's Dissertations, diss. ii. Leechman's Sermon on Prayer.

PRAYER, *Common*. See COMMON PRAYER and LITURGY.
PRAYERS of forty Hours. See HOURS.

PRAYERS, in *Mythology*, were, according to Hesiod, Jupiter's daughters, moaning sisters, who were repulsed oftener than they were heard. Homer, in the speech of Phoenix to Achilles (Il. l. 9.), gives the following description of them :

“ Pray'rs are Jove's daughters, of celestial race ;
Lame are their feet, and wrinkled is their face ;
With humble mien and with dejected eyes,
Constant they follow where Injustice flies :
Injustice swift, erect, and unconfined,
Sweeps the wide earth, and tramples o'er mankind, }
While Pray'rs, to heal her wrongs, move slow behind. }
Who hears these daughters of almighty Jove,
For him they mediate to the throne above :
When man rejects the humble suit they make,
The fire revenges for the daughter's sake ;
From Jove commission'd, fierce Injustice then
Descends, to punish unrelenting men.”

The mythologists give several explications of this allegory : but it requires no great penetration to find out that Homer calls Prayers lame, because they come not always just after the injury that occasions them ; that they are wrinkled and have downcast eyes, to denote how apt men are to defer repentance, and how humble at last, when they want to make their peace with the offended party.

PRAYSSAC, in *Geography*, a town of France, in the department of the Lot ; 12 miles N.W. of Cahors.

PRE', *St. Gervois*, a town of France, in the department of Paris ; 10 miles N.E. of Paris.

PREABOCCO, a town of Italy, in the Veronese ; 13 miles N.W. of Verona.

PREACHING, in *Theology*, the declaration, or promulgation, of the word of God, in public, by a person authorized, and in a place appointed for the purpose.

The word is derived from the Hebrew *parashch*, *expofuit*, *he expounded*.

Anciently none but bishops were allowed to preach ; now, not only priests, but deacons, are qualified.

Any person may preach, whatever be his mental talents and acquirements, who is legally qualified for the exercise of this office, either according to the constitution of the established church, or under the act of toleration. But the honourable, acceptable, and useful discharge of the office of preaching, so as to prevent the office itself from sinking into disrepute and contempt, religion from suffering reproach, and the end of preaching, which is to make men wiser, better, and happier, from being defeated, requires a variety of qualifications, that cannot be attained in an age, when miracles have ceased, and when a spirit of general inquiry prevails, without previous study. It is desirable that the preacher, like the physician, should possess a fund of general knowledge ; but it is indispensable, that he should be well acquainted with those subjects that immediately pertain to his profession. Without a considerable degree of this kind of knowledge, whatever popularity of a particular kind he may acquire, he is not likely to gain permanent reputation among persons of reflection and judgment, or to promote the mental and moral improvement of his auditors. Different situations, however, admit of the exercise of different talents, and preachers, undistinguished by literary, scientific, or even theological acquirements, have been eminently useful in impressing the heart, and regulating the practice, without communicating any great degree of information to the understanding. At the same time, it ought never to be forgotten, that, as Dr. Blair says, “ the understanding must always be applied to in the first place, in order to make a

lasting impression on the heart ; and he who would work on men's passions, or influence their practice, without first giving them just principles, and enlightening their minds, is no better than a mere declaimer. He may raise transient emotions, or kindle a passing ardour ; but can produce no solid or lasting effect.” Nevertheless, it should also be remembered, “ that all the preacher's instructions are to be of the practical kind ; and that persuasion must ever be the ultimate object. It is not to discuss some abstruse point, that he ascends the pulpit ; it is not to illustrate some metaphysical truth, or to inform men of something which they never heard before ; but it is to make them better men ; it is, at once, to give them clear views and persuasive impressions of religious truth. The eloquence of the pulpit, then, must be popular eloquence. One of the first qualities of preaching is to be popular ; not in the sense of accommodation to the humour and prejudices of the people (which tends only to make a preacher contemptible), but, in the true sense of the word, calculated to make impressions on the people ; to strike and to seize their hearts. I scruple not, therefore, to assert, that the abstract and philosophical manner of preaching, however it may have been sometimes admired, is formed upon a very faulty idea, and deviates widely from the just plan of pulpit eloquence. Rational, indeed, a preacher ought always to be ; he must give his audience clear ideas on every subject ; and entertain them with sense, not with sound. But to be an accurate reasoner will be small praise, if he be not a persuasive speaker also.” A preacher, who would deliver a persuasive oration, must himself be a good man. A well-known and approved character for piety and virtue will very much contribute to his success. As no man, on any subject, can be truly eloquent, who does not utter the “ *veræ voces ab imo pectore*,” who does not speak the language of his own conviction and his own feelings, this circumstance is supereminently requisite in preaching. Here, “ it is of the utmost consequence that the speaker firmly believe both the truth and the importance of those principles which he inculcates on others ; and, not only that he believes them speculatively, but have a lively and serious feeling of them. This will always give an earnestness and strength, a fervour of piety to his exhortations, superior in its effects to all the arts of studied eloquence ; and without it, the assistance of art will seldom be able to conceal the mere declaimer. A spirit of true piety would prove the most effectual guard against those errors which preachers are apt to commit. It would make their discourses solid, cogent, and useful ; it would prevent those frivolous and ostentatious harangues, which have no other aim than merely to make a parade of speech, and amuse an audience.” “ The chief characteristics of the eloquence suited to the pulpit, as distinguished from other kinds of public speaking, appear to be these two ; gravity and warmth. The serious nature of the subjects belonging to the pulpit requires gravity ; their importance to mankind requires warmth.” These two qualities should be duly combined ; as “ the grave, when it is predominant, is apt to run into a dull uniform solemnity ; the warm, when it wants gravity, borders on the theatrical and light.” This union should be regarded by the preacher, both in the composition of his discourses, and in his manner of delivery. “ Gravity and warmth united form that character of preaching, which the French call ‘ *onction* ;’ the affecting, penetrating, interesting manner, flowing from a strong sensibility of heart in the preacher to the importance of those truths which he delivers, and an earnest desire that they make full impression on the hearts of his hearers.” Blair's Lectures, vol. ii.

For further particulars relating to the subject of preaching,

see ELOCUTION (*Elocution of the Pulpit*), ORATION, PUBLIC SPEAKING, and SERMON.

Bishop Wilkins has delivered the art of preaching, in a treatise called *Ecclesiastes*, or the Preacher.

The religious of the order of St. Dominic assume the quality of preaching-brothers, friars-predicant, or predicants.

PRÆADAMITE, PRÆADAMITA, a denomination given to the inhabitants of the earth; conceived, by some people, to have lived before Adam.

Isaac de la Pereyra, in 1655, published a book to evince the reality of Preadamites; by which he gained a considerable number of profelytes to the opinion; but the answer of Demarets, professor of theology at Groningen, published the year following, put a stop to its progress; though Pereyra made a reply.

His system was this; the Jews he calls Adamites, and supposes them to have issued from Adam; and gives the title Preadamites to the Gentiles, whom he supposes to have been a long time before Adam.

But this being expressly contrary to the first words of Genesis, Pereyra had recourse to the fabulous antiquities of the Egyptians and Chaldeans, and to some of the idle rabbins; who imagined there had been another world before that described by Moses.

He was apprehended by the inquisitors in Flanders, and very roughly used, though in the service of the Dauphin. But he appealed from their sentence to Rome, whither he went in the time of Alexander VII., and where he printed a retractation of his book of Preadamites.

PREAMBLE, in Law, the beginning of an act of parliament, &c. serving, as it were, for a key to open the intent of the makers of the act, and the mischiefs intended to be prevented or remedied thereby.

PREAUDIENCE. See PRECEDENCE.

PREBEND, PRÆBENDA, the portion which a prebendary receives for his maintenance out of the estate of a cathedral, or collegiate church.

The term prebend is usually confounded with *canonicate*, or *canonica*; yet there is a real difference. A prebend is properly a right which an ecclesiastic has in a cathedral, or collegiate church, where he officiates, to receive certain ecclesiastical revenues, and to enjoy certain dues, either in money or in kind (so called a *præbendo*, q. d. *afforded* or *allowed* him; not à *præbendo auxilium*, or *consilium episcopo*); whereas *canonica* is a mere title, or spiritual quality, which a person enjoys independent of any præstation, or any temporal revenue; so that the prebend may subsist without the canonicate; but the canonicate is inseparable from the prebend.

For it is not to the prebend that the right of suffrage, and other spiritual rights are annexed, but to the canonicate; and when the prebend is joined to the canonicate, it becomes spiritual by virtue of the canonicate to which it is attached.

Anciently the pope created canons with the right of having place in the choir, a deliberative voice in the chapter, and an expectation of the first prebend that should become vacant; but this was prohibited by the council of Trent: yet the pope still confers the canonicate without any prebend, when he would confer a dignity in a church, for the obtaining of which it is required the candidate be a canon.

This they call a canonicate *ad effectum*, and sometimes a *jus ventosum*, which is no more than an empty title, conferred purely to qualify a man for a dignity restrained to the capacity of canon.

Originally the prebend was only a livery, or portion of things necessary to life, given daily; at present the rents and profits of the church are divided into fixed portions, called prebends, which are enjoyed independently. Of common right the bishop is patron of all the prebends, be-

cause the possessions were derived from him. In such case, he prefers to them by collation, which is the same thing with institution, as no presentation is made; but if a prebend be in the gift of a layman, the patron presents to the bishop, who institutes in like manner as to another benefice; and then the dean and chapter induct them, that is, after some ceremonies, place them in a stall in the cathedral church to which they belong; by which they are said to have a place in the choir. Some prebends are donative. At Westminster, the king collates by patent, and by virtue thereof the prebendary takes possession without institution or induction; and the king, at this day, is patron of most of the great prebends.

Prebends are either *simple*, or with *dignity*. The latter are such as, beside their prebends, have some jurisdiction annexed to them.

No person may hold more than one prebend in the same church; and if a prebendary accepteth of a deanery, his prebend is void by cession, the acceptance of a deanery being understood to be in the same church. So if he is made a bishop, the king presents to his prebend.

Neither prebendaries nor canons appear to have any cure of souls; and therefore a prebend and a parochial benefice are not incompatible, but both may be holden together, without a dispensation; nor is he who takes a title to a prebend thereby obliged, by 13 Eliz. cap. 12. to subscribe or read the thirty-nine articles.

No part of the revenue of the church of Canterbury is allowed to any prebend in particular, except the annual stipend of 17*l.* 6*s.* 8*d.*, which by the 16th chapter of the statutes is to be paid to every prebendary "pro corpore præbendæ suæ." The residue of the revenue is the joint property of the dean and chapter, as being an aggregate body; and no member has a right to any part of it.

PREBENDARY, PRÆBENDARIUS, an ecclesiastic who enjoys a prebend.

Prebendaries and canons of cathedral and collegiate churches have this in common, that they have each a portion of the revenues of the church for their subsistence; the one under the title of *præbenda*, prebend; the other under the title of *canonica*, or canonicate; and have each places and voices in the chapter; but they differ in this, that the former receives his portion or prebend in consideration of his officiating and serving in the church; but the latter without any such consideration, merely by his being received into the cathedral or college, *per assignatum stallum in choro, et locum in capitulo*.

Prebendaries and canons are bound to preach in their turns, or provide proper substitutes. By 28 Hen. VIII. cap. 11. the profits of a prebend, during the vacation, shall go to the successor, towards the payment of his first-fruits.

A prebendary leaving a house, by death or cession, out of repair, shall himself or by his executors be liable to a sort of dilapidation, though it was not annexed to the prebendal stall.

No prebendaries nor canons in cathedral or collegiate churches, having one or more benefices with cure (and not being residentiaries in the same cathedral or collegiate churches), shall, under colour of their said prebends, absent themselves from their benefices with cure, above the space of one month in the year, unless it be for some urgent cause, and certain time, to be allowed by the bishop. And such of the said canons and prebendaries, as by the ordinances of the cathedral or collegiate churches do stand bound to be resident in the same, shall so among themselves proportion the times of the year, as that some of them shall always be personally resident there; and all such residentiaries shall, after the days of their residency, appointed by their local statutes or customs expired, presently repair to their benefices or some one of them, or to some other charge

where the law requireth their presence, there to discharge their duties according to the laws in that case provided. And the bishop of the diocese shall see the same to be duly performed and put in execution. Car. 44.

PREBENDARY, *Golden, of Hereford*, called also *præbendarius episcopi*, is one of the twenty-eight minor prebendaries, who has, *ex officio*, the first canon's place that falls.

He was anciently confessor of the bishop and cathedral, and had the altarages; on which account he was called the *golden* prebendary.

PRECARIÆ, or PRECES, in our *Ancient Law Books*, days-works, which the tenants of certain manors are bound to give their lords in harvest-time.

These in some places are corruptly called *bind-days*, for *biden-days*, from the Saxon, *biddan*, to pray.

Magna Precaria was a great or general reaping-day.

The lord of the manor of Harrow, in Middlesex, had, 21 Ric. II. a custom, that by summons of his bailiff on a general reap-day, then called *magna precaria*, the tenants should do one hundred and ninety-nine days work for him; every tenant that had a chimney fending a man.

PRECARIOUS, in *Commerce*, an appellation given to a kind of trade carried on between two nations at war, by the intervention of a third at peace with them both.

Thus the English held a precarious commerce with the Spaniards by means of the Portuguese; when the two former nations being at war, the third lent its vessels, its colours, and name, to continue their trade.

PRECARIOUS *Jurisprudence*, is applied to a fund or stock, of which a person has not the full propriety, whereof he cannot dispose absolutely, and which is most of it borrowed.

PRECATORRES, in *Church History*, a sect of heretics, who, under the pretence of praying always, refused to work.

PRECE PARTIUM, in *Law*, the continuance of a suit by consent of both parties.

PRECEDENCE, PRECEDENCY, or *Præcedency*, a place of honour which a person is entitled to in companies; either sitting, or walking.

With regard to the order of precedency, it may be observed in general, that persons of every degree of honour or dignity take place according to the seniority of their creation, and not of years, unless they are descended of the blood-royal; in which case they have place of all others of the same degree.

Precedency is either of *courtesy*, or *de jure*, of right.

The former is that which is due to age, or estate, &c. which is regulated by custom and civility.

The latter is settled by authority, and where broken in upon, gives an action at law.

Here we may observe, that the younger sons of the preceding rank take place from the eldest son of the next mediate; *viz.* the younger sons of dukes from the eldest sons of earls; the youngest sons of earls from the eldest sons of barons. The whole chain of precedency is founded upon this gradation, and thus settled by act of parliament. (31 Hen. VIII. cap. 11. A.D. 1539.) By subsequent alterations, all the sons of viscounts and barons are allowed to precede baronets; and the eldest sons and daughters of baronets have place given them before the eldest sons and daughters of any knights, of what degree or order soever, though superior to that of a baronet; these being but temporary dignities, whereas that of baronets is hereditary; and the younger sons of baronets are to have place next after the eldest sons of knights. There are also some great officers of state, who take place, although they are not noblemen, above the nobility of higher degree; and there are some persons, who, on account of their dignities in the church, degrees in the universities, and inns of court, officers

in the state or army, although they are neither knights nor gentlemen born, that nevertheless take place among them. Thus, all colonels and field-officers, who are honourable. As also the master of the ordnance, quarter-master general, doctors of divinity, law, physic, and music, deans, chancellors, prebendaries, heads of colleges in universities, and serjeants at law, are, by courtesy, allowed place before ordinary esquires. And all bachelors of divinity, law, physic, and music; masters of arts; barristers in the inns of courts; lieutenant-colonels, majors, captains, and other commissioned military officers; and various patent officers in the king's household, may equal, if not precede, any gentleman that has none of these qualifications. In towns corporate, the inhabitants of cities are preferred to those of boroughs, and those who have borne magistracy to all others. It has been also determined in the earl marshal's court of honour, that all who have been lord mayors of London, shall every where take place of all knights-bachelors, because they have been the king's lieutenants.

The rules of precedence in England may be reduced to the following table: in which, those marked * are entitled to the rank here allotted them, by statute 31 Hen. VIII. c. 10; those marked †, by statute 1 W. & M. c. 21; those marked ||, by letters patent 9, 10, & 14 Jac. I. which see in Seld. tit. of hon. ii. 5. 46. and ii. 11. 3; those marked ‡, by ancient usage and established custom; for which see (among others) Camden's *Britannia*, tit. *ordines*. Milles's catalogue of honour, edit. 1610. and Chamberlayne's present state of England, b. iii. ch. 3.

TABLE of Precedence.

- * The king's children and grand-children.
- * ————— brethren.
- * ————— uncles.
- * ————— nephews.
- * Archbishop of Canterbury.
- * Lord chancellor or keeper, if a baron.
- * Archbishop of York.
- * Lord treasurer
- * Lord president of the council } if barons.
- * Lord privy seal
- * Lord great chamberlain. But }
see private stat. 1 G. I. c. 3.
- * Lord high constable
- * Lord marshal
- * Lord admiral
- * Lord steward of the household
- * Lord chamberlain of the household } above all peers of their own degree.
- * Dukes.
- * Marquesses.
- ‡ Dukes' eldest sons.
- * Earls.
- ‡ Marquesses' eldest sons.
- ‡ Dukes' younger sons.
- * Viscounts.
- ‡ Earls' eldest sons.
- ‡ Marquesses' younger sons.
- * Secretary of state, if a bishop.
- * Bishop of London.
- * ————— Durham.
- * ————— Winchester.
- * Bishops.
- * Secretary of state, if a baron.
- * Barons.
- † Speaker of the house of commons.
- † Lords commissioners of the great seal.
- ‡ Viscounts' eldest sons.

† Earls' younger sons.
 † Barons' eldest sons.
 || Knights of the Garter.
 || Privy counsellors.
 || Chancellor of the exchequer.
 || Chancellor of the duchy.
 || Chief justice of the king's bench.
 || Master of the rolls.
 || Chief justice of the common pleas.
 || Chief baron of the exchequer.
 || Judges, and barons of the coif.
 || Knights bannerets, royal.
 || Viscounts' younger sons.
 || Barons' younger sons.
 || Baronets.
 || Knights bannerets.
 † Knights of the Bath.
 † Knights bachelors.
 || Baronets' eldest sons.
 || Knights' eldest sons.
 || Baronets' younger sons.
 || Knights' younger sons.
 † Colonels.
 † Serjeants at law.
 † Doctors.
 † Esquires.
 † Gentlemen.
 † Yeomen.
 † Tradesmen.
 † Artificers.
 † Labourers.

The ladies take place, or precedency, according to the degree of quality of their husbands.

With regard to the precedency among women, we may observe, that women, before marriage, have precedency by their father; with this difference between them and the male children, that the same precedency is due to all the daughters that belong to the eldest. By marriage, a woman partakes of her husband's dignities; but none of the wife's dignities can come, by marriage, to her husband, but are to descend to her next heir. If a woman has precedency by creation or birth, she retains the same, though she marry an inferior; but if a woman nobly born marry any nobleman, as a baron, she shall take place according to the degree of her husband only, though she be a duke's daughter. A woman, privileged by marriage with one of noble degree, shall retain the privilege due to her by her husband, though he should be degraded by forfeiture, &c. The wife of the eldest son of any degree takes place of the daughters of the same degree, who always have place immediately after the wives of such eldest sons, and both of them take place of the younger sons of the preceding degree. And this rule holds, not only in comparing degrees, but also families of the same degree among themselves. The precedency among women is as follows.

The queen and princesses of Wales; princesses and duchesses of the blood; duchesses; wives of the eldest sons and daughters of dukes of the blood; marchionesses; wives of the eldest sons and daughters of dukes; countesses; wives of the eldest sons and daughters of marquesses; wives of the youngest sons of dukes; viscountesses; wives of the eldest sons, and daughters of earls; wives of the younger sons of marquesses; baronesses; wives of the eldest sons, and daughters of viscounts; wives of the younger sons of earls; wives of the eldest sons and daughters of barons; wives of the younger sons of viscounts; wives of the younger sons of barons; wives of baronets; wives of the knights of the Garter; of the Bath; and of knight-bachelors; wives of the eldest sons and daughters of baronets; wives of the

eldest sons and daughters of knights of the Garter; wives of the eldest sons and daughters of knights of the Bath; wives of the eldest sons and daughters of knights-bachelors; wives of the younger sons of baronets; wives of esquires by creation; of esquires by office; of gentlemen; daughters of esquires; of gentlemen; wives of citizens; of burghesses, &c. The wives of privy-counsellors, judges, &c. are to take the same place as their husbands do. For the precedence and pre-audience among barristers in the English courts, see COUNSEL.

PRECEDENT, in *Law*, frequently denotes an original, authentic instrument, or writing; serving as a form to draw others by.

Hence precedent books, &c. full of draughts of deeds, conveyances, &c. for attornies.

PRECEDENT *Condition*. See CONDITION.

PRECENTOR, PRÆCENTOR, a dignitary in cathedral churches, popularly called the *chantor*, or *master of the choir*.

The præcentor is so called, from the Latin *præ*, and *cano*; because he is supposed to lead the choir, and *sing before* the rest.

PRECEPT, PRÆCEPTUM, in *Law*, a command in writing, sent by a chief-justice, justice of peace, or other like officer, for the bringing of a person, record, or other matter, before him.

PRECEPT is also used for the command, or incitement, whereby one man stirs up another to commit felony, theft, &c. Bracton speaks of three diversities of offending in murder; *viz. præceptio, fortia, consilium*.

Præceptio, is the instigation used beforehand; *fortia*, the assistance in the fact; *consilium*, the advice given either before or after.

PRECEPT of *election to parliament*. See PARLIAMENT.

PRECEPTORY, PRÆCEPTORIA, *Commandry*; a kind of benefice held by the more eminent among the ancient Knights Templars, who were created by the grand master, with the title of *præceptores Templi*, i. e. *masters of the Temple*.

Stephens, *De jurid. lib. iv.* says, the preceptories were only a kind of cells, all subordinate to their principal mansion, the Temple in London.

Of these preceptories, Dugdale says, he finds sixteen recorded, as anciently belonging to the Templars in England, *viz.* Cressing Temple, Balshal, Shengay, Newland, Yevely, Witham, Temple Bruere, Willington, Rotheley, Ovington, Temple-Comb, Trebigh, Ribstane, Mount St. John, Temple-Newsum, and Temple-Hurst. But there were more. See COMMANDRY.

PRECES. See PRECARIÆ.

PRECES *Primariæ*, or *Primæ*, is the denomination of an imperial prerogative, by which the emperor exercises, and hath immemorially exercised, a right of naming to the first prebend that becomes vacant after his accession, in every church of the empire. This right was also exercised by the crown of England in the reign of Edward I. and probably gave rise to the royal corodies. See CORODY and OPTION.

PRECESSION, PRECESSION, in *Astronomy*, a term applied to the equinoxes, which by a very slow insensible motion, change their place, going backward or westward, *i. e. in antecedentia*, as astronomers call it, or contrary to the order of the signs.

It is shewn, in the new astronomy, that the pole, the solstices, the equinoxes, and all the other points of the ecliptic, have a retrograde motion; and are continually moving from east to west, or from Aries towards Pisces, &c. by means of which the equinoctial points are carried farther and farther back, among the preceding signs of stars at the rate of about fifty seconds each year, which retrograde motion is called the *precession, recession, or retrocession of the equinoxes*.

Hence, as the fixed stars remain immoveable, and the

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equinoxes go backward, the stars will seem to move more and more eastward with respect to them; whence the longitudes of the stars, which are reckoned from the first point of Aries, or the vernal equinox, are continually increasing.

Hence it is, that the interval of time between any equinox and that same equinox, in the following revolution of the earth (which astronomers call the *tropical year*) is some minutes shorter than the *sidereal year*, or the period in which the earth revolves from one point of her orbit to the same point again; and, because the retrograde motion of the equinoctial points thus advances during the time of every equinox a little sooner than it would otherwise have happened, this phenomenon is called the "precession of the equinoxes."

Hence it is that the constellations have all changed the places assigned them by the ancient astronomers: in the time of Hipparchus, and the oldest astronomers, the equinoctial points were fixed to the first stars of Aries and Libra; but the signs are now no longer in the same points; and the stars which were then in conjunction with the sun when he was in the equinox, are now a whole sign, or thirty degrees, to the east of it; thus the first star of Aries is now in the portion of the ecliptic, called Taurus; and the first star of Taurus now resides in Gemini; and Gemini is advanced into Cancer, &c. The equinoxes will have made their revolution westward, and will be returned to Aries again, or the constellations will have made theirs eastward, and will again fall into their former places with regard to the equinoxes, in 25816 years, according to Tycho; in 25920, according to Ricciolus; and in 24800, according to Cassini.

These phenomena may be clearly understood by a view of *Plate XIX. Astronomy, fig. 7.* Let NZSVL be the earth, SONA its axis produced to the starry heavens, and terminating in A, the present north pole of the heavens, which is vertical to N, the north pole of the earth. Let EOQ be the equator, T \ominus Z the tropic of Cancer, and VT \wp the tropic of Capricorn; VOZ the ecliptic, and BO its axis, both which are immoveable among the stars. But, as the equinoctial points recede in the ecliptic, the earth's axis SON is in motion upon the earth's centre O, in such a manner as to describe the double cone NO π and SO σ , round the axis of the ecliptic BO, in the time that the equinoctial points move quite round the ecliptic, which is 25,920 years; and in that length of time, the north pole of the earth's axis produced, describes the circle ABCDA in the starry heavens, round the pole of the ecliptic, which keeps immoveable in the centre of that circle. The earth's axis being about $23\frac{1}{2}$ degrees inclined to the axis of the ecliptic, the circle ABCDA described by the north pole of the earth's axis produced to A, is 47 degrees in diameter, or double the inclination of the earth's axis. In consequence of this, the point A, which at present is the north pole of the heavens, and near to a star of the second magnitude in the tail of the constellation called the Little Bear, must be deserted by the earth's axis; which moving backwards a degree every 72 years, will be directed towards the star or point B in 6480 years hence; and in double of that time, or 12,960 years, it will be directed towards the star or point C; which will then be the north pole of the heavens, although it is at present $8\frac{1}{2}$ degrees south of the zenith of London L. The present position of the equator EOQ will then be changed into eOq, the tropic of Cancer T \ominus Z into V \ominus t, and the tropic of Capricorn V \wp T into v \wp Z; as is evident by the figure. And the sun, in the same part of the heavens where he is now over the earthly tropic of Capricorn, and makes the shortest days and longest nights in the northern hemisphere, will then be over the earthly tropic of Cancer, and make the days longest and nights shortest. So that it will require 12,960 years yet

more, or 25,920 from the then present time, to bring the north pole N quite round, so as to be directed towards that point of the heavens which is vertical to it at present. And then, and not till then, the same stars which at present describe the equator, tropics, and polar circles, &c. by the earth's diurnal motion, will describe them over again.

The ancients, and even some among the moderns, have taken the equinoxes to be immoveable; and ascribed that change of distance of the stars from it, to a real motion of the orb of the fixed stars, which they supposed to have a slow revolution about the poles of the ecliptic; so as that all the stars perform their circuits in the ecliptic, or its parallels, in the space of 25,920 years; after which they should all return again to their former places.

This period the ancients called the Platonic or great year; and imagined, that at its completion every thing would begin as at first; and all things come round in the same order as they have already done.

The physical cause of the precession of the equinoxes, Sir Isaac Newton demonstrates, arises from the broad or spheroidal oblate figure of the earth; which itself arises from the earth's rotation around its axis; for as more matter is accumulated all round the equatorial parts than any where else on the earth, the sun and moon, by attracting this redundance of matter, bring the equator sooner under them in every return towards it, than if there was no such accumulation.

In order further to illustrate the operation of this cause, and to evince its effect, we should consider how the action of the sun produces the retrograde motion of the nodes of the moon; as it will follow, from the same principles, that if a planet revolved about the earth near to its surface in the plane of the equator, its nodes would also go backward, though with a slower motion than those of the moon, in proportion as its distance from the centre of the earth was less than that of the moon. Suppose the number of such planets to be increased till they touch each other, and form a ring in the equator, and the nodes of this ring would go backward in the same manner as the nodes of the orbit of any one planet revolving there. Suppose then this ring to adhere to the earth, and its nodes would still go backward, but with a much slower motion, because the ring must move the whole earth, to which it is supposed to adhere. The elevation of the equatorial parts of the earth has the same effect as such a ring would have, excepting only that the motion of the nodes of the equator, or of the equinoctial points, is slower, because the accumulated parts of the earth, above a spherical figure, are diffused over its surface, and have a less effect than if they were all collected in the place of the equator, in the form of a ring. The moon has a greater force on this ring than the sun, on account of her less distance from the earth; and they both contribute to produce the retrograde motion of the equinoctial points; the motion, however, produced by both is so slow, that those points will not finish a revolution in less than above 25,000 years. Sir Isaac Newton has determined the quantity of this motion from its causes, and finds it, as deduced from the theory, to be consonant with the observations of astronomers. We shall here add, that there is another effect of the action of the sun and moon on this ring, which is too small to be sensible in astronomical observations; their action on the ring makes its inclination to the ecliptic to decrease and increase, by turns, twice every year.

Allowing the case to be as above stated, and since the plane of the moon's orbit is at one time above ten degrees more inclined to the plane of the equator than at another, it is reasonable to conclude, that the part of the whole annual precession, which arises from her action, must in different years be varied in its quantity; whereas the plane of the ecliptic,

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ecliptic, in which the sun appears, keeping always nearly the same inclination to the equator, that part of the precession, which is owing to the sun's action, may be the same every year; and hence it follows, that, although the mean annual precession, proceeding from the joint actions of the sun and moon, were $50''$, or $50\frac{1}{2}''$, yet the true annual precession might sometimes exceed, and sometimes fall short, of that mean quantity, according to the various situations of the nodes of the moon's orbit; and Dr. Bradley, from a variety of observations, found this to be the case; or, that the precession of the equinoctial points varies; nor are astronomers entirely agreed as to the quantity of the variation, so as to establish what the mean precession is. Dr. Bradley assumes the mean precession to be one degree in seventy-one years and a half. According to this estimate, the Platonic or great year would be equal to 25,740 solar years.

Sir Isaac Newton, in determining the quantity of the annual precession from the theory of gravity, upon supposition that the equatorial is to the polar diameter of the earth, as 230 is to 229, finds the sun's action sufficient to produce a precession of $9\frac{1}{2}''$ only; and collecting from the tides the proportion between the sun's force and the moon's to be as 1 to $4\frac{1}{2}$, he settles the mean precession resulting from their joint actions, at $50''$. But since the difference between the polar and equatorial diameter is found, by the late observations of the gentlemen of the Royal Academy of Sciences at Paris, to be greater than what sir Isaac had computed it to be; the precession arising from the sun's action must likewise be greater than what he has stated it at, nearly in the same proportion. From whence it will follow, that the moon's force must bear a less proportion to the sun's than $4\frac{1}{2}$ to 1. Phil. Trans. vol. xlv. art. 1.

To determine the quantity of the precession, arising from the action of the sun, has been a problem much agitated among modern mathematicians; and although there is no doubt of Newton's mistake in the solution of it, other authors have generally disagreed. M. d'Alembert, in 1749, printed a treatise on this subject, and claims the honour of having been the first who rightly determined the method of solving problems of this nature. The subject has been also considered by Euler, De la Grange, Frisius, Silvabelle, Walmesley, Simpson, Emerson, Landen, Milner, and Vince.

M. de Silvabelle, stating the ratio of the earth's axis to be as 178 to 177, makes the annual precession caused by the sun $13'' 52''' 11''''$; the mean annual precession caused by the moon, the ratio of the lunar force to the solar being supposed $= \frac{5}{2}$, $34'' 16''' 51''''$; and the nutation of the earth's axis caused by the moon, during the time of a semi-revolution of the pole of the moon's orbit, *i. e.* in $9\frac{1}{2}$ years, $17'' 51''' 14''''$. Mr. Walmesley makes the annual precession, owing to the sun's force, on the supposition that the proportion of the earth's diameters is as 230 to 229, and the obliquity of the ecliptic to the equator $23^\circ 28' 30''$, equal to $10''.583$; but supposing the proportion of the diameters to be as 178 to 177, the annual precession depending on the action of the sun will be $13''.675$. And supposing with Dr. Bradley, that the whole mean annual precession is $50''.3$, the mean precession, owing to the force of the moon, will be $39''.717$, and the force of the moon to that of the sun as 3.753 to 1, the diameters being as 230 to 229; but this proportion being $\frac{177}{178}$, the annual precession arising from the action of the moon will be $36''.625$, and the force of the moon to that of the sun as 2.678 to 1. Mr. Simpson, by a different method of calculation, determines the whole annual precession of the equinoxes caused by the sun, to be $21'' 6'''$; and he has pointed out the errors of the computations proposed by Mr. Silvabelle and Mr. Walmesley. Mr. Milner's deduction, and also professor Vince's, agree with that of Mr. Simpson.

The quantity above stated would be the precession of the equinox, arising from the attraction of the sun, if the earth were a solid of an uniform density, and the ratio of the diameters as 229 : 230; but professor Vince has shewn, that, if the greatest nutation of the earth's axis be rightly stated, the precession is only about $14\frac{1}{2}''$; which differences between the theory, and what is deduced from observation, must arise, either from the fluidity of the earth's surface, an increase of density towards the centre, or the ratio of the diameters being different from that which is here assumed; or probably from all the causes conjointly. This regression of the equinoxes, caused by the plane of the equator moving backwards upon the ecliptic, must necessarily cause the poles of the earth to describe circles about the poles of the ecliptic, in a direction contrary to the order of the signs, setting aside the effect of nutation. Our author, having ascertained the precession, shews how to find the corresponding nutation. If we take the whole precession for the time the sun is moving from the equinox to the tropic, to be $\frac{1}{4}$ th of $14\frac{1}{2}''$, the nutation at the tropic $= 1''$, which is the greatest nutation arising from the force of the sun. If y be supposed to denote an arc described by the sun in the ecliptic, to a radius equal to unity, whilst a point of the equator describes an arc about its axis in an indefinitely small given time, which may also represent its velocity, the nutation from the time the sun leaves the equinox $= \frac{1}{2}'' - \frac{1}{2}'' \times \cos. 2y$, and at 45° from the equinoxes, the inclination is the mean, it varying half a second each way from thence. Hence, at the equinoxes, the nutation $= \frac{1}{2}''$, and at the tropic, the nutation $= -\frac{1}{2}''$ from the mean inclination; and the nutation at any time from the mean inclination $= \frac{1}{2}'' \cos. 2y$. The equation of the precession is greatest in the middle point between the equinox and tropic, and is there $= 1'' 9'''$; and it is to be subtracted in the first and third quadrants of the ecliptic, and added in the second and fourth. It appears that the inequality of the precession, and the nutation, may be represented, by supposing the pole of the equator to describe a circle of $1''$ diameter about the mean pole every half year; and therefore the apparent distance of every star from the pole of the equator, will be subject to a variation of $1''$ twice in a year from this cause.

The inequality of the precession of the equinoxes, and the nutation of the earth's axis, arising from the attraction of the moon in different situations of its nodes, was discovered, as we have already suggested, by Dr. Bradley. Dr. Bradley communicated his observations to Mr. Machin, who soon after sent him a table of the annual precession and the corresponding nutation, in the various situations of the moon's nodes. These were calculated upon the supposition that the pole of the equator, during a period of the moon's nodes, moved round in the periphery of a circle of $18''$ diameter, having the centre $23^\circ 29'$ from the pole of the ecliptic, that circle having an angular motion of $50''$ about the same pole. The north pole of the equator was conceived to be in that part of the small circle which is farthest from the north pole of the ecliptic, when the moon's ascending node is in the beginning of Aries; and the opposite point of it, when the same node is in the beginning of Libra. But Dr. Bradley afterwards observed, that the calculations would agree better with observations, if the true pole of the equator described an ellipse instead of a circle, whose minor axis is about $16''$, and lying parallel to the ecliptic. This is confirmed by theory. From all the observations of Dr. Bradley, Dr. Maskelyne fixed the whole nutation at $19''.1$. In the table computed by professor Vince, it is assumed at $19''$. We shall here remark, that sir Isaac Newton had taken notice of the nutation of the earth's axis; and Mr. Flamsteed, in his Hist. Cæl. vol. iii. p. 113, informs

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forms us that he attempted to discover its quantity, but found his instruments not sufficiently accurate for the purpose. Some hints relating to it have been found by M. de la Lande in the MSS. of Roemer. But though the nutation of the earth's axis had been so long suspected, the discovery of the cause and quantity of it was reserved for Dr. Bradley. See NUTATION, LIGHT, and STARS.

Mr. T. Simpson, in his "Miscellaneous Tracts," has shewn how to find the precession during a revolution of the moon's node, and his method, which is pronounced to be as simple as the subject will admit of, is adopted by professor Vince. Hence it appears, that the whole quantity of nutation during half a revolution of the node from γ : the corresponding quantity of precession :: 10 : 174 very nearly. If the moon's orbit coincided with the ecliptic, the effect of the moon would be to that of the sun, in the ratio of their densities; therefore the mean precession of the moon : that from the sun in a compound ratio of 0.988 : 1, and of the density of the moon : the density of the sun; consequently the density of the moon : density of the sun :: the precession from the moon : precession from the sun \times 0.988. If the annual precession arising from the sun be taken = $21'' 6'''$, and the whole precession = $50''$, then the part arising from the action of the moon will be $28'' 54'''$, hence the density of the moon : the density of the sun :: $28'' 54''' : 21'' 6''' \times 0.988 = 20'' 8'''$, which ratio does not agree with the proportion deduced from

the tides, or with the accurate observations of Dr. Bradley. The best method, says Vince, of settling this point, is from the greatest nutation. The nutation, during half a revolution of the moon's node from Aries, Dr. Maskelyne fixed at $19''.1$, and it may be assumed at $19''$; hence 10 : 174 ::

$19'' : \frac{174 \times 19''}{10}$ the precession from the moon during that time, which we may take equal to 9.31 years; hence the

mean precession from the moon in one year = $\frac{174 \times 19''}{10 \times 9.31}$;

therefore, if we take the whole precession in a year to be $50\frac{1}{4}''$,

we have $50\frac{1}{4}'' - \frac{174 \times 19''}{10 \times 9.31} = \frac{10 \times 9.31 \times 50\frac{1}{4}'' - 174 \times 19''}{10 \times 9.31}$

for the part of the precession arising from the sun. Hence, the density of the moon : the density of the sun ::

$174 \times 19'' : 10 \times 9.31 \times 50\frac{1}{4}'' - 174 \times 19'' \times 0.988 :: 2.44 : 1$. Consequently, the part of the precession arising from the action of the moon is = $35'' 39'''$, and that of the sun = $14'' 36'''$, and the greatest equation of the precession arising from the moon = $17''.7$.

The following table shews the mean precession of the equinoctial points in longitude for complete years.

Years.	Precession.	Years.	Precession.	Years.	Precession.	Years.	Precession.
1	0 50.3	31	26 0.8	61	0 51 11.3	91	1 16 21.8
2	1 40.7	32	26 51.2	62	0 52 1.7	92	1 17 12.2
3	2 31.0	33	27 41.5	63	0 52 52.0	93	1 18 2.5
4	3 21.4	34	28 31.9	64	0 53 42.4	94	1 18 52.9
5	4 11.7	35	29 22.2	65	0 54 32.7	95	1 19 43.2
6	5 2.1	36	30 12.6	66	0 55 23.1	96	1 20 33.6
7	5 52.4	37	31 2.9	67	0 56 13.4	97	1 21 23.9
8	6 42.8	38	31 53.3	68	0 57 3.8	98	1 22 14.3
9	7 33.1	39	32 43.6	69	0 57 54.1	99	1 23 4.6
10	8 23.5	40	33 34.0	70	0 58 44.5	100	1 23 55.0
11	9 13.8	41	34 24.3	71	0 59 34.8	200	2 47 49.9
12	10 4.2	42	35 14.7	72	1 0 25.2	300	4 11 44.9
13	10 54.5	43	36 5.0	73	1 1 15.5	400	5 35 39.3
14	11 44.9	44	36 55.4	74	1 2 5.9	500	6 59 34.8
15	12 35.2	45	37 45.7	75	1 2 56.2	600	8 23 29.8
16	13 25.6	46	38 36.1	76	1 3 46.6	700	9 47 24.8
17	14 15.9	47	39 26.4	77	1 4 36.9	800	11 11 19.7
18	15 6.3	48	40 16.8	78	1 5 27.3	900	12 35 14.7
19	15 56.6	49	41 7.1	79	1 6 17.6	1000	13 59 9.7
20	16 47.0	50	41 57.5	80	1 7 8.0	2000	27 58 19.3
21	17 37.3	51	42 47.8	81	1 7 58.3	3000	41 57 29.0
22	18 27.7	52	43 38.2	82	1 8 48.7	4000	55 56 38.6
23	19 18.0	53	44 28.5	83	1 9 39.0	5000	69 55 48.3
24	20 8.4	54	45 18.9	84	1 10 29.4		
25	20 58.7	55	46 9.2	85	1 11 19.7		
26	21 49.1	56	46 59.6	86	1 12 10.1		
27	22 39.4	57	47 49.9	87	1 13 0.4		
28	23 29.8	58	48 40.3	88	1 13 50.8		
29	24 20.1	59	49 30.6	89	1 14 41.1		
30	25 10.5	60	50 21.0	90	1 15 31.5		

For a farther account of the principles and reasoning of the mathematicians above cited, we must refer to the Phil. Transf. vol. xlviii. art. 58. vol. xlix. art. 109. vol. l. art. 53. vol. lxvii. part 1. art. 15. vol. lxix. part ii. art. 32. Vince's Complete System of Astronomy, vol. ii.

M. de la Lande estimates the quantity of the precession at $50\frac{3}{4}''$ yearly. Mem. Acad. de Paris, 1781. See ECLIPTIC and NODE.

PREGHAC, in *Geography*, a town of France, in the department of the Gironde, and chief place of a canton, in the district of Bazas; 6 miles S.W. of Bazas. The place contains 2664, and the canton 7496 inhabitants, on a territory of 255 kilometres.

PRECIÆ, in *Botany*, the twenty-first among the natural orders of Linnæus, consisting of *Primula*, *Androsace*, *Diapensia*, *Aretia*, *Dodecatheon*, *Cortusa*, *Soldanella* and *Cyclamen*; to which is subjoined, in a separate section, *Limosella*; and in a third division, with a mark of doubt, *Mennyantbes*, *Hottonia* and *Samolus*. See LYSIMACHIÆ.

PRECIGNE', in *Geography*, a town of France, in the department of the Sarthe; 4 miles W.N.W. of La Flèche.

PRECIGNY le Grand. See PRESSIGNY le Grand.

PRECIOUS, or PREVIOUS-stone. See GEM.

PRECIPE, or PRÆCIPE, in *Law*, a species of original writ, called *optional*, which commands the defendant to do the thing required, or shew the reason wherefore he hath not done it. The use of this writ is where something certain is demanded by the plaintiff, which is in the power of the defendant himself to perform; as to restore the possession of land, to pay a certain liquidated debt, to perform a specific covenant, to render an account, and the like; in all which cases, the writ is drawn up in form of a præcipe or command to do thus, or shew cause to the contrary; giving the defendant his choice, to redress the injury, or stand the suit. This writ is distinguished from the peremptory writ, called *si te fecerit securum*.

PRECIPE, or *Præcipe*, is also a name given to a writ of covenant; the foundation of which is a supposed agreement or covenant, that one party shall convey lands to the other; on the breach of which agreement, action of covenant is brought by the party to whom the land is to be conveyed or assured, who thus commences an action or suit at law against the other.

PRECIPE, or *Præcipe quod reddat*, a writ of great diversity, both as to form and use, extending as well to writs of right, as to other writs of entry and possession.

It is sometimes called a *writ of right close*, as when it issues out of the court of chancery close; sometimes a *writ of right patent*, as when it issues out of chancery patent, or open, to any lord's court, for any of his tenants deforced, against his deforcer.

PRECIPE in *Capite*. See PRÆCIPE.

PRECIPITANT, PRÆCIPITANS, in *Chemistry*, a term applied to any liquor, which, being poured on a dissolution, separates what is there dissolved, and makes it precipitate, *i. e.* fall to the bottom of the vessel.

PRECIPITANT is also used, in *Medicine*, for a remedy, which separates and precipitates any heterogeneous matter contained in the mass of blood; and by this means abates any irregular fermentations, effervescences, of the like disorders, which the matter had excited.

Among the number of precipitants are ranked hartshorn, crabs' eyes, ivory, bezoard, barks of oak and guaiacum, iron, quinquina, chalk, &c.

PRECIPITATE, PRÆCIPITATUS, in *Chemistry*, a substance, which, having been dissolved in a proper menstruum,

is again separated from its dissolvent, and thrown down to the bottom of the vessel, by the pouring in of some other liquor.

When a body is decomposed by means of an intermediate substance, and a precipitate is formed by this decomposition, this precipitation can be effected only by the intermediate substance uniting with one of the component matters of that body; and consequently a new compound is always formed in these operations. Sometimes the separated matter, being no longer soluble, becomes sensible, and falls as a precipitate, while the new compound remains dissolved. In other instances, the separated substance remains dissolved, while the new combination, not being soluble, is precipitated. This depends on the nature of the substances which act one upon another in these operations: but we may easily perceive, that the precipitates of the former kind are *simple*, and those of the latter are *compound*. Earth and metals, when separated from acids by means of alkalies, or other metals, are simple precipitates, and when separated from acids by other acids, they are compound. See PRECIPITATION.

PRECIPITATES, *Metallic*. See PRECIPITATION, in *Assaying*.

PRECIPITATE of Gold by Tin, &c. See GOLD, &c.

PRECIPITATE, *White*, *Red*, and *Per se*, are all oxyds, or salts of mercury. See MERCURY.

PRECIPITATION, PRÆCIPITATIO, a process in chemistry, which, in its most extensive sense, is applicable to all chemical decompositions made by an intermediate substance; or, to all operations in which two bodies are dissolved by employing a third body, which has the property of uniting with one of these, and thereby of separating the other; so that every precipitation is effected by means of the affinity of a precipitant much stronger than that of the precipitate with the substance from which it is separated. In a more confined sense, precipitation is a kind of separation, whereby a body, dissolved and suspended in any menstruous liquor, is detached from it, and falls down to the bottom of the vessel.

Precipitation, in its more extended sense, comprehending any visible separation of any substance or compound, from its clear solution, whether it sinks or swims, and whether it be crystallized or pulverulent, forms one of the great operations of chemistry, and is directly opposed to that of solution. Till the late experiments of Berthollet on the subject of affinity (see AFFINITY), all chemists seem to have coincided with Bergman, who maintained, that in cases where a compound was decomposed by the superior affinity of one of its elements for a third substance, there was a total transfer of the base from the substance of the weakest to that of the strongest affinity: and hence originated the term "single elective affinity," which was made use of to signify, that if to the compound A. B. a body C. was added, possessed of a superior attraction for A. than B. has, A. would, by election or choice, as it were, quit B. entirely, and form with C. a new compound, A. C., to the exclusion of B. Berthollet has shewn, in his valuable essays on chemical affinity, and on chemical statics, how philosophers have been led to deduce the supposed order of affinities from the circumstances of precipitation. These changes, which, according to the theory of Bergman, were supposed to be produced by the predominance of certain affinities over others, are ascribed by Berthollet to those circumstances which influence attraction and limit combination. If four substances, for example, be presented to each other, two of which have a greater tendency to cohesion than the other two, so as to form by their union an insoluble compound, instead of one compound being formed by

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By the union of the four, in which the affinities are balanced, this will be averted by the force of cohesion, and the two which form the insoluble compound will unite, and be separated by precipitation or crystallization, leaving the other two in combination in the fluid which has been the medium of action. "If even these four substances were previously in the reverse binary combinations, on presenting them to each other, the affinities within the sphere of action must be reciprocally exerted; and the same extraneous forces will cause an exchange of principles, or the phenomena which have been ascribed to elective affinities will be produced." To avoid the term elective attraction, Berthollet denominates cases of this kind *complex affinity*. The explanation of single elective attraction, or where three substances are presented to each other, is precisely the same; the union which takes place between two of them being determined by the tendency to cohesion, or the disposition of the combination of two of them to form a compound of little solubility.

The proportion also of the substances presented to each other considerably influences these combinations; and the changes produced by the decomposition are scarcely ever complete; especially where the force of cohesion has not been powerfully exerted, so as to render the effect of quantity imperceptible. Elasticity likewise has a considerable influence in determining decompositions where the application of heat is necessary; and, according to Berthollet, the decomposition of a compound body, of which one of the ingredients has a great tendency to assume the elastic form, is to be ascribed to the disposition it has to escape from its combination, when aided by the intervention of even a weaker affinity.

In complex affinities the same cause determines the union of substances disposed to assume the elastic form, and separates them as a volatile compound. "If, therefore," says he, "it be desired to know the result of the exposure of two salts to the action of heat, it is only necessary to consider which of the two bases, and which of the two acids have the greater volatility, if there be a difference: for the more volatile base and acid will escape and enter into combination, and the fixed base and fixed acid will remain behind, and combine with one another."

There are two principal kinds of precipitates which have been distinguished by chemistry, one where to a compound composed of an acid and a base, each highly soluble in water, another acid is added, which has a greater affinity with the base, and forms with it a compound less soluble than the first. In this case the precipitate (which is sometimes crystallized, sometimes otherwise) is composed of the acid last added, in proportions that vary but little. As, for example, when sulphuric acid is added to a saturated solution of nitrate of potash, a crystallized precipitate of sulphate of potash is added, the proportions of which scarcely vary in any circumstances, though the actual quantity of precipitate is determined by the quantity of water and of sulphuric acid present.

Another kind of precipitate is that which has usually been supposed to be simple, and takes place when to a compound of an acid and a base insoluble (or nearly so) in water, an alkali or soluble earth is added, which, by elective affinity, unites with the acid, and displays the former base; and this latter, now supposed to be uncombined and insoluble in the quantity of liquid present, falls to the bottom. This kind of precipitation is constantly resorted to when we wish to obtain the simple earths, as in adding an alkali to a solution of alum, in order to precipitate the alumine, to Epsom salt to precipitate magnesia, &c. But the precipitate in all such cases is not (as has been usually supposed) the simple

earth, but it always retains, after the first operation, a small and variable portion of the acid with which it was before combined. Thus if the alumine, however welledulcorated, be redissolved in muriatic acid, and a salt of barytes added, there will be a sensible precipitate of sulphate of barytes. This *retent* of acid is variable, and may be reduced to an insensible quantity, if not absolutely taken away, by subsequent digestion in very concentrated alkali. Such precipitations, therefore, are not affected merely by simple affinity, but by a division of the acid into two portions, one of which, and by much the largest, goes to the alkali, and the other remains with the earth, and accompanies it in its precipitation. Even when no precipitation occurs, the acid may be proved to distribute itself in this manner, for, as Bergman has remarked, if a calcareous salt is dissolved in fifty times its weight of water, and an excess of potash or soda is added, no precipitation takes place, so that the acid continues in part to act upon the lime, and renders it soluble in a much less quantity of water than the lime alone would require for solution.

It may be assumed, therefore, as a general principle, and one which is of great importance in the explanation of chemical decomposition, that where a salt is composed of an acid and a base, insoluble or little soluble by itself, the decomposition effected by any soluble base is the result not of a simple but a compound action, in which, on the one hand, the decomposing base unites with more or less of the acid and remains in solution, whilst the other base resumes its insolubility by the separation of part of its acid, and forms a precipitate with the remainder. This will be found to apply still more strikingly in the formation of metallic precipitates, and of those salts which (like the sub-sulphate of mercury or turbith) were formerly taken for simple oxyds, but are now found to be salts with excess of oxyd.

Chemical affinity is, in many cases, determined by precipitation; but a contradiction in the mode of applying this principle has been well pointed out by Berthollet.

The orders of affinity which the several bases have for the acids is usually determined by adding any base to a known combination of an acid and another base, and if the latter base is precipitated, it has been inferred that its affinity for the acid is less than that of the other base. Thus, when lime is precipitated by adding potash to muriate of lime, it is inferred that potash has a stronger affinity for muriatic acid than lime, and hence the preference in the order of affinity has been given to the most soluble bases. But, on the other hand, the respective affinities of the acids has been determined in the contrary way, as for example, when oxalic acid is added to muriate of lime a precipitate of oxalate of lime is produced, whence the superior affinity of the oxalic acid over the muriatic for lime has been deduced. Thus, in these cases, the preference in affinity has been given to those acids which have the most disposition to form insoluble combinations.

But many instances may be given to shew that the phenomena of precipitation are distinct from those of chemical affinity, so that the resulting insolubility or force of cohesion which produces precipitations is sometimes superadded to the simple force of affinity, and at other times opposed to it, and ought in strictness to be always considered as a distinct principle.

PRECIPITATION, in *Assaying*, is the separation of any part of a compound body, while melting in the fire, or when cooling from fusion, from the rest of the mass, in such a manner that it sinks to the bottom, while the remainder continues at top, and makes the surface. The heavy part thus

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thus precipitated from the rest is called the *regulus* of that body.

This is an operation which almost always requires the addition of such ingredients, as serve to take away the mutual connection and coherence of the parts of the body to be separated; that is, such as have a menstrual virtue, and keep others in a state of dissolution. For instance, the reguline part of antimony, and mineral sulphur, dissolve each other mutually, and constitute crude antimony; nor can they be separated from each other by fire alone, without destroying the regulus; but if you add iron, copper, silver, &c. which are more thoroughly penetrated by sulphur, and are thus reduced to the state of ore, then the regulus of antimony is freed of its sulphur, and sinks to the bottom, as it is heavier than the additional bodies, when joined to the sulphur.

Such a precipitation by fusion happens in vitrifications, scorifications, and coppelings, while one part of the body turns into dross, or scoriae, and the other metallic part, if there be any, keeping still its metallic form, is collected at the bottom of the spherical vessel. Therefore silver and gold, which are hardly subject to a perfect vitrification, constantly remain and shew themselves in their own form; and on this account, though they were in ever so small a quantity in a coppel, they always shew themselves very clearly to the eye when the scoriae are absorbed: whereas so small a regulus of the other metals would have been as it were buried and hidden under so great a quantity of scoriae.

Nor is precipitation by fusion less necessary to obtain almost all the other metals, which, on this account, are called less perfect, unless perhaps you except a very small quantity of native metal, which nevertheless can scarcely be properly called pure. Besides, they are all to be had either in form of earth, or that of a solid ore. In the first case, you may make a glass by a bare fusion; in the second, if the sulphur and arsenic, which, together with the metallic part, constitute an ore, are dissipated in roasting, the ore, destitute of the oily phlogiston, (says Cramer,) becomes glass in a pure fire, which glass may be mixed with unmetallic stones and earths; but by adding a phlogiston or inflammable principle to it, this metallic glass is again reduced to its metalline form; and so long as it keeps under this form, it cannot be united with the glass of the other species, but sinks to the bottom of it, except only a very small quantity of it, which is detained by the clamminess of the glass. The precipitating body in this case, therefore, is truly the phlogiston, or inflammable principle: any body that takes away the connection, by the removal of which a precipitation is made, is properly called the precipitating body.

Precipitation of solid bodies from fluid menstrua is performed either by extracting, or evaporating over a gentle fire the dissolving menstruum out of the dissolved fixed body, or by adding such a body, as is greedily dissolved by that menstruum: as if one metal dissolved by an acid is precipitated by another metal, or by an alkaline salt; for instance, silver dissolved in aqua fortis is precipitated by copper, copper by iron, iron by zinc, and all metals and semi-metals, either partly or entirely, by pot-ashes, volatile and urinous salts.

A precipitation is also made by pouring on a solution such things as either cannot dissolve the body in hand, whether alone, or joined to a menstruum that contains the said body; or dissolve it in another manner; or in a lesser quantity than if the menstruum had been used pure. In the first case, a total precipitation is performed, as may be seen in the precipitation of silver out of aqua fortis, by means of

spirit of salt. In the second, a great deturbation and precipitation is made; but a second solution soon follows, as it happens when iron being dissolved in aqua fortis, you add to it, in a proper manner, a liquor perfectly free from alkaline fixed salt; but then there remains usually a certain part, which is not perfectly dissolved a second time. In the third case, there is but a partial precipitation made. You have an instance of this, if mercury dissolved in aqua fortis, and the menstruum thoroughly saturated with it, is precipitated either by common salt, or sal ammoniac, or by their acid spirit. A precipitation is also sometimes made only by adding a large quantity of fair water to dilute; such is that made on the regulus of antimony dissolved in spirit of common salt, or in aqua regia, when a large quantity of cold water is poured on this solution; for these menstrua do not dissolve this semi-metal, unless concentrated.

All these precipitations are promoted greatly by a gentle heat, by means of which the precipitating body enters more easily into the menstruum, and a considerable quantity of water is next necessary to dilute with, except in the precipitations of the first kind; for most commonly the more concentrated dissolutions assume the consistence of a paste, so soon as the precipitating body is added to them, which hinders this from mixing equally with the solution. Cramer.

The metal of every metallic solution in any acid is always in the state of an oxyd, so that the solution must contain at least three substances, *viz.* the acid, the metal, and oxygen united with the metal.

A metallic solution may be decomposed, and its metallic part precipitated, either in the reguline state or as an oxyd, and these two methods, which have each been adopted in the analysis of metallic bodies, require to be considered separately.

When a carbonated alkali is added to a metallic solution, the precipitate is a carbonated oxyd of the metal, and, like the other carbonates, effervesces on the addition of a stronger acid. But when a pure alkali is added only to saturation, the precipitate is, in some instances, nearly a pure oxyd, but in the greater number is an oxyd retaining a small portion of the acid with which it was united. This acid, however, is not sufficient to render it soluble, and it may be generally entirely taken away by subsequent digestion in a concentrated fixed alkali, provided the oxyd is not soluble therein.

The first action of alkalies, therefore, on most metallic solutions, is to cause an unequal division of the acid, the greater part of which unites with the alkali, and the remainder falls down along with the oxyd now rendered insoluble. If the ammonia be the alkali employed, there is also in general a partition of the alkali, and the precipitate is a quadruple compound, of the metal, the oxygen united with it, and a small portion of the acid, and of the ammonia; and the solution contains the greater part of the acid, of the alkali, and often a small part of the metallic oxyd sufficient to be very sensible to the taste, and to chemical tests. According to Proust, lime also, when used as a precipitant, enters in a small proportion into the precipitate.

Metallic solutions sometimes yield precipitates on the mere addition of water, by the simple distribution of the constituents into two portions, a soluble and an insoluble one, the former of which has an excess of acid, and the latter of oxyd. Thus, when the clear nitrate of bismuth is diluted with water, a white precipitate falls down, which is chiefly oxyd of bismuth, and the supernatant liquor contains an excess of acid, and a small portion of metal which may be separated by evaporation, or by an alkali. In like manner,

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manner, if sulphuric acid and mercury are treated together, sulphureous acid is given out, and the white mass that remains is an uniform acid sulphate, which deliquesces into a dense solution. But if hot water be added, the *turbith*, or yellow *sub-sulphate* of mercury is precipitated, and the solution contains an acid sulphate. Even the first turbith may be further decomposed by a fresh affusion of hot water, dividing it into a turbith still more loaded with oxyd, and an acid solution.

These, and many other facts which might be adduced, illustrate the general law of decomposition by precipitation, and the constant tendency of metallic salts to divide into two compounds, each consisting of both the constituents of the salt, but distributed in unequal proportions. These phenomena are rendered still more complex by the addition of new substances, most of which, being described under the respective metals, a repetition in this place would be needless.

The second species of metallic precipitates are those in which the metal appears in its reguline form. This takes place when one metal is precipitated by another, as when a piece of iron is immersed in a solution of copper, and also when phosphorus is kept for some time in certain metallic solutions.

Before the discovery of oxygen, and of the oxydation of metals being necessary to their solution in acids, the precipitation of one metal by another was supposed to be produced by simple elective attraction, and the respective affinities of the metals for the acids was put down in the order of the precipitations which they produced. But this explanation, though true in general, does not explain a number of apparent anomalies in metallic precipitation, so that we must take into consideration the force of other agents and other affinities.

The order of the precipitation of one metal by another is the following, among those that have been the most accurately examined, *viz.* zinc, iron, lead, tin, copper, silver, mercury, gold; that is to say, zinc precipitates all the other metals; iron precipitates all but zinc; lead all but zinc and iron, &c.

But sometimes the precipitation fails with solutions in one acid, though it succeeds with others; thus zinc separates iron in the metallic state from muriate of iron, but only as an oxyd from the nitrate. A small excess of acid is necessary to begin the process in all cases.

During this operation, the following affinities must act; namely, that of the precipitant (or metal by which the separation is effected) for the oxygen of the metal already dissolved; that of the oxyd thus produced, for the acid of the solution; and to this Berthollet adds, that of the two metals for each other when in the reguline state. The sum of these affinities must overcome that which exists between the constituent parts of the metallic salt intended to be decomposed.

It is possible, therefore, that no precipitation may take place even when the metal added has a greater affinity for oxygen than that already dissolved, if the oxyd of the former metal has a less affinity for the acid than the oxyd of the latter has. And, on the other hand, a precipitation may be effected, even if the precipitant has less affinity for oxygen than the metal already dissolved, provided its oxyd has a greater affinity for the acid. In this latter case, however, there must be a considerable excess of acid present in order to begin the oxydation of the precipitant. Thus, again, it is explained why a precipitation will take place with the solution in one acid, and not in the other, since the acids themselves differ considerably in their affinity for

the same metallic oxyd, so that in the first case, this affinity may surpass that of the same acid for the metallic oxyd already dissolved, and in the second may fall short of it.

Still, however, (as Berthollet remarks,) if the only active affinities in these cases were those of the metals for oxygen and the oxyds for acids, it is not probable that the reduction of the metal whose affinities were the weakest, would be complete, but in all probability there would be only an unequal partition of the acid and oxygen, so as to produce the *more* oxygenated salts of one metal, and the *less* oxygenated salts of the other metal, which would be agreeable to the usual mode of action in similar cases. Hence it becomes necessary to recur to the well-known affinity which exists between the metals themselves, and many facts shew that this is concerned in these processes.

For example, when a plate of polished copper is dipped into a solution of nitrated mercury, it is instantly whitened by the mercury precipitated upon its surface; but this metal is not merely deposited upon the copper, but amalgamated with it, so that it cannot be scraped or rubbed off, but can only be separated by fire. Here, then, the affinity of the mercury for the copper must act forcibly in causing its separation from the nitric acid which held it in solution. In like manner when copper is immersed in a solution of silver, the precipitated metal is not pure silver, but an alloy, containing a very small portion of copper. As this mutual affinity existing between the metals varies according to the metal employed, this also explains why iron (for example) precipitates silver from its solution with much more difficulty than copper, though iron has a much stronger affinity for oxygen than copper (as is proved by the precipitation of copper by iron), for the affinity between silver and copper is much stronger than between silver and iron.

As, then, metallic precipitates are in fact alloys (though often with such a small proportion of the precipitant as to be scarcely sensible), it is necessary that the combination of the metals must first be made when both are in solution, for we can conceive of no other method by which two solid metals (copper and iron for example) should be alloyed in a common temperature. The whole process, therefore, must be the following, taking the above metals as instances; a portion of the iron must first be oxydated and dissolved in the acid, and by this it difoxydates, and precipitates in the metallic form an equivalent portion of the copper, during which time the dissolved iron must divide itself into two very unequal portions, of which by far the largest part remains in solution, but the remainder must return to the metallic state to unite with the copper, and to be precipitated along with it. This complicated action must take place even from the first, for how else can the union of the two metals be accounted for? and still less can it be explained without this supposition, as the precipitation proceeds, when the surface in contact with every fresh stratum of precipitate is no longer iron, but an alloy of copper and iron, almost approaching to pure copper.

This leads us also to consider what is the affinity that determines the place to which the precipitates attach themselves. In the first instance, that is, when a surface of pure iron is exposed to the cupreous solution, the precipitate may be supposed to attach itself to the iron rather than to fall down loose in the vessel on account of the affinity existing between iron and copper alloyed with a little iron; but after the surface of the iron bar is covered, each successive stratum of precipitate attaches itself, not to the iron (for this is covered), but to the surface of the precipitate already formed, that is to say, to a substance of exactly the same composition

composition as itself. In this latter case, therefore, the same kind of affinity acts as when a saline solution during crystallization deposits its crystals on the portion of salt already separated, rather than on a naked surface. The adhesion in this instance, however, is very slight, and readily broken. The proportion of the precipitant which enters into the alloy is probably greater in the first stratum of precipitate than in the subsequent ones; thus when copper is separated by iron, the part immediately in contact with the iron is visibly browner than the rest, owing probably to a larger admixture of iron.

It has been mentioned that phosphorus will separate some metals from their solutions in the reguline state. These are particularly gold, silver, mercury, and copper. If a stick of clean new-melted phosphorus is immersed in an acidulated solution of sulphate of copper, in a day or two it becomes beautifully spangled with little knobs of bright metallic copper, which gradually increase to a thick crust, after which, if the stick is put into boiling water, the phosphorus will melt out, and leave a delicate hollow cylinder of copper. In this case, however, as in the former, the precipitate is not pure copper, but an alloy of copper with phosphorus, or a phosphuret, in which, however, the quantity of phosphorus is extremely small, and the solution contains phosphoric acid. When phosphorus is introduced into a solution of mercury, only part of this metal assumes the metallic form, and the rest is oxyd combined with phosphorus and phosphorous acid.

From what has been observed above, it is obvious that the method of recovering one metal from its solution by the addition of another, which is so often resorted to in analysis, requires considerable precaution, is liable to many inaccuracies, and can only be employed with propriety in certain cases. The circumstances which forbid its use, or render it inconvenient, are the following. 1st. Where the salt formed by the union of the precipitant in the acid is insoluble in water, and will not mix with the precipitated metal, from which it cannot be readily separated, as when sulphate of copper is decomposed by lead, antimony, or mercury, for the sulphates of these metals are little soluble in water: or, 2dly, where the newly formed salt would be decomposed by the water, as when any nitrated solution is precipitated by bismuth: or, 3dly, when the whole of the new oxyd formed by the transfer of oxygen from the precipitated metal to the precipitant cannot be dissolved by the acid present, as when nitrate of copper is decomposed by lead, in which case the precipitate will be very largely alloyed by the precipitant: or, 4thly, when the affinities of the precipitant are such as more easily to decompose the acid than to absorb the oxygen of the metal already dissolved, as when nitrate of copper is decomposed by zinc, in which case the precipitate is partly reguline and partly oxydated: and, 5thly, where the affinities between the two metals are so strong that the precipitate is largely alloyed with the precipitant, as when a solution of silver is decomposed by mercury.

Of these five cases, the third is probably that which much more contributes to produce a large alloy of the precipitated metal than even the affinity existing between the two metals; thus Vauquelin found that 50 grs. of copper, dissolved in nitric acid, even with excess of acid, required no less than 216 grs. of lead for its complete separation, and the precipitate, instead of weighing only 50 grs., amounted to 128 grs. of which, therefore, 50 were copper, and 78 were lead. Yet these two metals have but little affinity for each other. This inconvenience is corrected, though not entirely

removed, by adding a considerable excess of acid. See Aikin's Dict. art. *Precipitate*.

PRECIPUT, *q. d. precipuate*, formed from *precipuus*, *principal*, in the *French Jurisprudence*, an advantage belonging to any one, in a thing to be divided, or a portion taken off, and set by, in his favour, before the division made.

In noble partition, the eldest has always the principal fief, or manor for his preciput, in which view, the preciput coincides with the right of primogeniture.

PRECISION, *PRÆCISIO*, in the *Schools*, the same with abstraction.

PRECISION, in *Writing*, denotes such a brevity as consists in saying nothing superfluous, and omitting nothing that is necessary. In this sense it is opposed to a tedious prolixity on the one hand, and an obscure conciseness on the other. See *STYLE*.

PRECKOL, in *Geography*, a town of Prussia, in Samland, on the Minia; 10 miles S.S.E. of Memel.

PRECONISATION, a proposition, or declaration, which the cardinal patron makes in the consistory at Rome, of a person nominated by some prince to a prelature, by virtue of letters of which he is the bearer; which the pope complying with, gives his collation.

The date of the bulls is dispatched on the same day with the preconisation.

PRECONTRACT, *PRÆCONTRACTUS*, a contract made before or prior to another; chiefly used in relation to marriages.

PRECORDIA, or *PRÆCORDIA*, in *Anatomy*, a word of rather indefinite import, applied more or less largely to the region of the stomach and heart.

PRECURSOR, *PRÆCURSOR*, *Forerunner*, in *Theology*, a person who goes before any one to notify his coming.

The term is peculiarly applied to St. John Baptist, who is styled the precursor of Jesus Christ, from what is said of him by St. Luke, "Thou, child, shall go before the face of the Lord to prepare his way."

PRECY-SUR-TILLE, in *Geography*, a town of France, in the department of the Côte-d'Or, and chief place of a canton, in the district of Samur; 7 miles S. of Samur. The place contains 609, and the canton 8330 inhabitants, on a territory of 237½ kilometres, in 20 communes.

PREDÀ, *LA*, a town of Italy, in the department of the Panaro; 18 miles W.S.W. of Modena.

PREDÀ *di Marignone*, a town of Sardinia; 33 miles N.E. of Castello Aragonese.

PREDÀ *de Sas Vominis*, a town of Sardinia; 25 miles N.E. of Castello Aragonese.

PREDECESSOR, a person who has preceded another in the same office or employ. See *ANCESTOR*.

PREDESTINARIAN, in *Ecclesiastical History*, a person who adheres to the doctrine of absolute predestination.

St. Augustin is considered as the founder of the sect of Predestinarians, he being the first of the fathers that seems to have asserted the doctrine in such express terms; though the Jansenists and Jesuits are still greatly divided about the real doctrine of St. Augustin, in this article, each interpreting it consistently with their own scheme.

Father Sirmond contends for an ancient sect of Predestinarians, or Predestinians, *Prædestinatiani*, contemporary with St. Augustin himself, and who had their rise in Africa, in the monastery of Adrumetum, from a misunderstanding of St. Augustin's doctrine. Hence they were led into a notion, that God not only predestinated the wicked to eternal punishment, but also to the guilt and transgression for which they are punished; and that thus both the good

and bad actions of all men were determined from eternity by a divine decree, and fixed by an inevitable necessity.

It is added, that the opinion spread thence throughout the Gauls, where one of them, a priest named Lucidus, was condemned by Faustus, bishop of Rheggio, and his sentence was confirmed by two councils.

However, the existence of this Predestinarian sect has been denied by many learned men, particularly the president Mauguin, and considered as an invention of the Semipelagians, designed to decry the followers of Augustin, by attributing to him unjustly this dangerous and pernicious error. Nor does it appear, though there might have been persons who embraced the Predestinarian opinions, that the abettors of them ever formed themselves into a sect.

The doctrine was again broached in the ninth century, by Godeschalcus, a Benedictine; who, as Hincmar, in a letter to pope Nicolas, says, maintained with the ancient Predestinarians, who had been already anathematized, that God predestinated some to eternal life, and others to eternal death; that God did not will all people to be saved; that Jesus Christ did not die for all, but only the elect, or those that are saved, &c.

This doctrine was again condemned in a synod held at Mentz, A. D. 848, and by a council at Quiercy, A. D. 849, in consequence of which Godeschalcus was treated with the utmost barbarity, and compelled to burn with his own hands the justification of his opinion, which he had presented to the council at Mentz. He was then cast into prison, where he died in the year 868 or 869, maintaining with his last breath the doctrine for which he had suffered.

The decrees of the former council were confirmed in a new council which met at Quiercy, A. D. 853; but they were declared null by a council assembled at Valence, A. D. 855, and the decrees of this council were confirmed by the council of Langres in the year 859, and in 860 by the council of Toufi.

This controversy was revived in the 16th century by Calvin, who maintained that the everlasting condition of mankind in a future world was determined from all eternity; and that God, in predestinating from all eternity one part of mankind to everlasting happiness, and another to endless misery, was led to make this distinction by no other motive than his own good pleasure and free will. This opinion was, in a very short time, propagated through all the reformed churches, by the writings of Calvin, and by the ministry of his disciples, and, in some places, was inserted in the national creeds and confessions: and thus made a public article of faith.

The unhappy controversy, which took its rise from this doctrine, was opened at Strasburg in the year 1560, by Jerome Zanchius, an Italian ecclesiastic, who was particularly attached to the sentiments of Calvin, and carried on in a manner that contributed very much to exasperate the passions and foment the discord of the contending parties.

The Predestinarian opinions have been maintained by considerable numbers, both in Popish and Protestant countries: and in our own country in particular, they have had many zealous advocates.

We shall here observe, that they have undergone a kind of relaxation by those who have been denominated *Baxterians*, for an account of whose tenets, see that article.

PREDESTINATION, PREDESTINATIO, in *Theology*, a judgment, or decree of God, by which he has resolved, from all eternity, to save a certain number of persons, hence named elect

Others define predestination, a decree to give faith in Jesus Christ to a certain number of men, and to leave the rest to their own malice and hardness of heart.

According to the Calvinistical scheme, the reason of God's predestinating some to everlasting life is not founded in a foresight of their faith and obedience, considered as independent upon any communication of grace from him, but is to be referred to his sovereign mercy and free grace; nevertheless, it is also maintained on this scheme, that the means are decreed as well as the end, and that God purposes to save none but such as by his grace he shall prepare for salvation by sanctification.

The Remonstrants define predestination more laxly and generally, the decree of saving believers, and damning unbelievers.

Some represent the election and predestination spoken of in scripture, as relative only to nations, and not to particular persons.

The greatest difficulties with which the modern theology is clogged, turn on the article of predestination: both the Romish and reformed churches are divided about it; the Lutherans speak of it with horror; the Calvinists contend for it with the greatest zeal; the Molinists and Jesuits preach it down as a most dangerous doctrine; the Jansenists assert it as an article of faith; the Arminians, Remonstrants, and Pelagians, are all avowed enemies of predestination.

Those strenuous patrons of Jansenism, the Portroyalists, teach, that God predestinates those who he foresees will co-operate with his grace to the end. Dupin adds, that men do not fall into sin because not predestinated; but they are not predestinated, because God foresaw their sins. See ELECTION and REPROBATION.

PREDESTINATION is also used for a concatenation of second causes appointed by Providence: in virtue of which, things are brought to pass by a fatal necessity, contrary to all appearances, and in spite of all opposition. See FATE, NECESSITY, and LEIBNITZIAN *Philosophy*.

The Turks are great Predestinarians; they esteem the slightest accident predetermined, and on this account, are much more daring in battle, and run greater risks of their lives than they would otherwise do.

PREDETERMINATION, PREDETERMINATIO, in *Philosophy* and *Theology*. The schoolmen call that concurrence of God which makes men act, and determines them in all their actions, both good and evil, *physical predetermination*, or *premotion*.

Divines hold, that God hath no part in sin, inasmuch as he only affords his concurrence to the physical part of human action, not to the moral part.

Physical predetermination, or premotion, if there be any such thing, is that action of God by which he excites a second cause to act: or by which, antecedently to all operations of the creature, or before it could operate in consequence either of the order of nature or reason, he really and effectually moves, and occasions it to produce all its actions: that is, whatever the creature does or acts, is really done and acted by the agency of God on the creature, who is all the time passive. So that, without such predetermination of God, all creatures must remain in an eternal state of inactivity; and with such predetermination it is impossible but they should do what they are thus put upon doing.

It is strongly controverted, whether or no such a physical predetermination be necessary to the action of natural causes: the Scotists maintain the negative; urging, that all natural causes are of their own nature determined to a certain

certain action; whence it should seem needless to call in a new predetermination of God, *c. gr.* to fire, to make it warm the hand. For if an object be, by the course of divine Providence, applied to fire; what need a second application of the fire to make it warm the object applied thereto? since beings are not to be multiplied unnecessarily.

And such predetermination some philosophers hold still less requisite to produce the acts of the will: at least, say they, the human mind must be allowed the common power and privilege of a second cause, and therefore be entitled to produce its own acts, as well as other strictly natural agents.

The Thomists, on the other hand, stand up strenuously for the physical predetermination: one of their principal arguments is drawn from the subordination of second causes to the first. Where there are several subordinate agents, say they, the lower agents do not act, unless first moved and determined thereto by the first; this being the very essence of subordination.

Again, the like they argue from the dominion of God over all his creatures: it is of the essence of dominion, say they, to apply and direct things subject thereto, to its own operations; and this, if the dominion be only moral, morally; but if it be also physical, physically. And that this is the case in respect of God and his creatures, is confessed. See LIBERTY and NECESSITY.

PREDIAL TITHES, *Decimæ Prædiales*, are tithes paid of things which grow from the ground only, as corn, grass, hops, and wood. See TITHES.

PREDIATORY DEBT. See DEBT.

PREDICABLE, PREDICABLE, in *Logic*, a general quality, or epithet, which may be predicated of, or applied to, several subjects.

Thus animal is predicable both of man and beast; man is predicable of Peter and James; triangle is predicable of a hundred different kinds of figures, as right-angled, scalenes, isosceles, &c.

The schoolmen reduce the predicables to five classes; *viz.* genus, species, proprium, differentia, and accidens; under one or other of which all that can be predicated of any subject is included.

A predicable is also called *universale logicum*, as having respect to other particular, and inferior or subject things: thus animal is an universal, with regard to man and beast. It is called a *logical universal*, to distinguish it from a metaphysical one, which is a common being considered in itself, and therefore denominated universal in *essendo*; whereas the logical one is only universal as to our conception and application.

Among the schoolmen, predicable is usually defined *unum, aptum prædicari de multis univoce, & divisim*: or, somewhat more clearly, a predicable is a nature which may be predicated univocally of all things to which it is common, and which, as it is dividually multiplied in all its subordinates, may be aptly predicated of them all.

Thus, when the appellation of virtue is attributed to justice, prudence, temperance, fortitude, charity, &c. the same reason may be given why each is distinguished by such name, as being all founded in a mediocrity, and being agreeable to right reason, which is the character of virtue.

Hence, if there be several things called by some common name, but the reason of such name is not the same in all, but different; these do not come under the name of predicables. As in the instance, *canis, dog*, which is both applied to a domestic animal, distinguished by its barking; to a constellation of the heavens; and to a sea-fish.

The way by which the mind comes to form such predicables, or universals, is this: among those things which fall under our observation, we find some characters and properties common to several, and others peculiar to each; what we find common, we consider apart, and thus we form an *universal* equally applicable to all. See UNIVERSAL.

PREDICABLY, PREDICABILITER, is used in the schools in opposition to *predicamentally*. Thus, matter is said to be united to form predicably, or *per accidens*, to exclude the notion of a predicamental accident.

PREDICAMENT, PRÆDICAMENTUM, in *Logic*, a class or order of beings, or substances, ranged according to their natures, called also *category*, and sometimes *catagorema*. See CATEGORY.

The word *prædicamentum* was first introduced by Boethius, in lieu of the Greek *κατηγοριαι*; and is used among the school-writers with a good deal of latitude and variety: for it either signifies the act of predicating, or the common predicate itself; or the genus or basis of any category; or the collection of several common predicates disposed in a certain order; which last is its more usual acceptation.

Hence some define predicament, a series of predicates traced from the genus, or highest term, through all the inferior genera and species. Thus, a series of substance drawn from substance through *body, living, animal, man, to Peter*, is called the predicament of substance.

The usual definition among logicians is, that predicament is a natural order or scheme, of some most general or universal thing, and of all that is contained under the same, that is, all the subordinate genera, species, and individuals.

The properties of a predicament, *ex parte vocis, i. e.* of the term or word by which the predicament or predicamental series is denoted, the logicians hold, are, that it be *one, simple, precise, and concinnous*.

“Vox una, & simplex, rebus concinna locandis.”

The conditions requisite *ex parte rei*, or of the thing to be ranged in a predicament, are contained in the following verse:

“Entia per sese, finita, realia, tota;”

i. e. it must be a *positive being*, in exclusion of non-entities, negations, privations, impossibilities, &c.; and a being *per se*, to exclude accidental things, factitious things, &c.; and *finite*, that is, of a limited nature and extent, to exclude God, and other transcendentals: *real*, since its intention is for the better and more commodious disposing of things in their places, to be the more distinctly known and conceived; and *whole*, or complete, as not being in the relation of a competent part, or as only accessory to some other.

PREDICAMENT, *Post*. See POST Predicament.

PREDICAMENTAL ACCIDENT. See ACCIDENT.

PREDICATE, PRÆDICATUM, in *Logic*, that part of a proposition which affirms or denies something of the subject. Thus, in *God made the world*; *made the world* is the predicate, and *God* is the subject.

A predicate, say the schoolmen, is properly a name predicated or spoken of another, as its subject: as *man*, in the proposition, *Peter is a man*.

It is a celebrated rule or law of predicates, that nothing is esteemed to be absolutely spoken or affirmed of another, unless it be affirmed thereof in such a manner, or by such an affirmation, as wants nothing either in the subject, predicate, or copula, to make it true.

This also is noted properly of a predicate, that it contains,

in some measure, its own subject: thus metal contains gold, copper, iron, &c. of which it is predicated.

The word predicate is sometimes used indifferently with *attribute*; but the more accurate writers make a distinction. Every predicate is indeed an attribute, since whatever is predicated of a thing, is attributed to it: so, if animated be predicated of man, it is also attributed to him; but every attribute is not a predicate: thus soul, learning, &c. are attributed to man, but not predicated of him.

PREDICATING is properly the act of affirming or denying somewhat of something. *As, Man is not a stone; body is a substance.* The thing thus predicated is called predicate.

In the doctrine of universals, or predicables, to predicate is to speak or declare a thing truly, directly, and affirmatively. Thus man is predicated of several, *i. e.* it is truly and directly affirmed that these several are men; as when I say, *Socrates is man, Plato is man, Aristotle is man, &c.*

The things predicated of others are reducible to three classes: *genera*, as animal, of man, &c.; *forms*, as whiteness, of a swan, &c.; and *equals*, of things of equal extent, as species, difference, proprium, &c.

The schoolmen distinguish several ways of predicating, as, 1. *In quod tantum*, which is to predicate essentially, both as to the thing and the manner, as, *justice is a virtue.* 2. *In quale tantum*, which is to predicate accidentally, both as to the thing and the manner, as *Peter is learned.* And, 3. *In quale quid, or in quale post quid*, which is to predicate both essentially and accidentally, as, *man is rational.*

PREDICTION, PRÆDICTIO, divination, prophecy, or foretelling what is to come, either by divine revelation, by art and human invention, or by conjecture. See DIVINATION and PROPHECY.

PREDIERE, LUC ANTONIO, of Bologna, in *Biography*, a musical composer in the service of the court of Vienna, where he spent almost the whole of his life, returning to his own country merely to die. He is regarded as one of the best composers of his school, one of those who best united the ancient taste with the modern. He was endued with a fertile imagination, and great variety of expression. The emperor Charles VI. had an affection for him, and had great pleasure in his conversation, which is no small praise; as that prince, with all his faults of ambition, had excellent moral principles, and was an acute and refined judge of music and dramatic poetry. Prediere first set many of Apostolo Zeno's operas for his imperial majesty, between the years 1711 and 1729, and one oratorio of Metastasio, "Ifacco, figure del Redentore."

PREDMOUTH POINT, in *Geography*, a cape in the English channel, on the coast of Cornwall, on the west side of the entrance of Fowey harbour.

PREDOMINANT, PRÆDOMINANS, that which prevails, appears most, or has some superiority or ascendancy over another thing.

PREDTEGINSKOI, in *Geography*, a town of Russia, in the government of Vologda; 48 miles S.W. of Ustring.

PREDY, in *Nautical Language*, signifying the same as *ready*. Thus, *predy the ship, or predy the ordnance*, is as much as to make things ready for a fight. *Predy the hold*, is to lay or stow every thing there in its due order and proper place.

PRE-EMPTION, PRÆEMPTIO, a privilege anciently allowed the king's purveyor, of having the choice and *first buying* of corn, and other provisions, for the king's house, at an appointed value, and both without consent of the owner.

In those early times the king's household, as well as those

of inferior lords, were supported by specific tenders of corn, and other victuals, from the tenants of the respective demesnes; and there was also a continual market kept at the palace gate, to furnish viands for the royal use. (4 Inst. 273.) This answered all purposes, in those ages of simplicity, so long as the king's court continued in any certain place. But when it removed from one part of the kingdom to another, it was necessary to send purveyors before-hand, to get together a sufficient quantity of provisions and other necessaries for the household; and lest an unusual demand should raise them to an exorbitant price, the powers before mentioned were vested in these purveyors; who, in process of time, greatly abused their authority, and became a great oppression to the subject, though of little advantage to the crown. By degrees the powers of purveyance declined; and were particularly abolished in Sweden by Gustavus Adolphus, towards the beginning of the 17th century. And with us in England, having fallen into disuse, during the suspension of monarchy, they were taken away by the stat. 12 Car. II. c. 24.

The parliament, in part of recompence, settled on Charles, his heirs, and successors, for ever, the hereditary excise of 15*d.* per barrel on all beer and ale sold in the kingdom, and a proportionable sum for certain other liquors. See EXCISE and REVENUE.

PREENING, in *Natural History*, the action of birds cleaning, composing, and dressing their feathers, to enable them to glide more easily through the air.

For their use herein, nature has given them an admirable piece of furniture; *viz.* two peculiar glands, which secrete an unctuous matter into an oil-bag, perforated; out of which the bird, on occasion, draws it with his bill.

PRE-ESTABLISHED HARMONY. See HARMONY.

PREETZE, in *Geography*, a town of the duchy of Holstein, 43 miles N.E. of Hamburgh.

PRE-EXISTENCE, PRÆ-EXISTENTIA, the state of a thing actually in being before another.

The ancient Pythagoreans and Platonists all asserted the pre-existence of human souls, *i. e.* that they were in being before they were joined to our bodies.

Origen also held the eternal pre-existence of souls.

The orthodox believe, that God created the world out of nothing; and not of a pre-existent matter.

Some persons have held mankind pre-existent to Adam. (See PRE-ADAMITE.) Divines of various descriptions maintain the pre-existence of Christ, in opposition to those who have appropriated to themselves the appellation of *Unitarians*. See that article.

PREFACE, PRÆFATIO, formed from *præ* and *fari*; *q. d.* to speak before, an advertisement in the beginning of a book, to inform the reader of the design, order, method, &c. observed in it: of what is necessary to receive its full effect, and facilitate the understanding of it.

There is no part of writing that requires more art and address, or which fewer authors succeed in than prefaces.

Prefacing is, in effect, a particular species of writing, and has its peculiar character and taste to distinguish it from all others. It is neither argumentation, discourse, narration, nor apology.

PREFACE of the Mass. The Romanists call that part of their mass, which precedes the consecration, and which is to be rehearsed in a peculiar tone, *preface*.

The use of prefaces in the church, they contend, is very ancient; and conjecture, from some passages of St. Cyprian, &c. that it was in use in the time of the apostles.

The preface to the mass anciently had, and still has, very different names in different churches. In the Gothic, or Gallican

Gallican rite, it is called *immolation*; in the Mozarabic rite, *illation*; anciently among the French, it was called *contestation*; in the Roman church alone it is called *præfatio*, *preface*.

PREFECT, PRÆFECTUS, in ancient Rome, was one of their chief magistrates, who governed in the absence of the kings, consuls, and emperors.

His power was somewhat different at different times; but was always greatest under the emperors. His principal care was the government and administration of the city of Rome.

He took cognizance of all crimes committed in the city, and within an hundred miles thereof. He judged capitally and finally, no appeal lying from him; and even by the sixty-second Novel, he presided in the senate, taking place before all the patricii and consulares, &c.

He had the superintendance of the provisions, policy, buildings, and navigation.

There is still a prefect in modern Rome, who is a kind of governor, differing little from the ancient prefectus, except that his authority only extends to forty miles round the city, whereas that of the prefect of ancient Rome reached one hundred miles round. With the empire, the prefect of the city had declined to a municipal officer; yet he still exercised, in the last appeal, the civil and criminal jurisdiction; and a drawn sword, which he received from the successors of Otho, was the mode of his investiture, and the emblem of his functions. The dignity was confined to the noble families of Rome; the choice of the people was ratified by the pope; but a triple oath of fidelity must have often embarrassed the prefect in the conflict of adverse duties. A servant, in whom they possessed but a third share, was dismissed by the independent Romans. At length, however, they consented, without reluctance, to the restoration of the prefect. About fifty years after this event (A. D. 1198—1216) Innocent III. delivered himself and the Romans from this badge of foreign dominion; he invested the prefect with a banner instead of a sword, and absolved him from all dependencies of oaths or service to the German emperors. In this place an ecclesiastic, a present or future cardinal, was named by the pope to the civil government of Rome; but his jurisdiction, as we have said, has been reduced to a narrow compass; and in the days of freedom, the right or exercise was derived from the senate and people. About thirty-eight years after the foundation of Constantinople, a similar magistrate was named in that rising metropolis, for the same uses, and with the same powers.

PREFECT of the Prætorium, *Præfectus prætorii*, or *præfectus prætorio*, was the chief or leader of the prætorian bands, or cohorts destined for the emperor's guard.

The prætorian legion, according to Dion, consisted of ten thousand men. Suetonius refers the institution of præfectus prætorii to Augustus. It is added, that he was usually taken from among the Roman knights.

By the favour of the emperors, his authority grew very considerable; insomuch, that he became the arbiter and supreme judge of all affairs.

As the government degenerated into a military despotism, the prætorian prefect, who in his reign had been a simple captain of the guards, was placed, not only at the head of the army, but of the finances, and even of the law. In every department of administration, he represented the person, and exercised the authority of the emperor. The first prefect, who enjoyed and abused this immense power, was Plautianus, the favourite minister of Severus. After his fall, the celebrated Papinius was appointed to the execution of this office. From the reign of Severus to that of Dio-

clitian, the guards and palace, the laws and the finances, the armies and the provinces, were entrusted to their superintendance; and, like the viziers of the East, they held with one hand the seal, and with the other the standard, of the empire.

To reduce this extravagant authority, Constantine, conformably to the plan of government instituted by Diocletian, divided the prefecture of the prætorium into four prefectures; and each of these he again subdivided into civil and military departments; though the name was only reserved to him who was invested with the civil authority; and that of *comes belli* given him who had the command of the cohorts. See COUNT.

The four prefectures of Constantine, which had before been assigned to four princes, were the following. 1. That of the East, whose prefect extended his ample jurisdiction into the three parts of the globe which were subject to the Romans, from the cataracts of the Nile to the banks of the Phasis, and from the mountains of Thrace to the frontiers of Persia. 2. The prefect of Illyrium once comprehended under his authority the important provinces of Pannonia, Dacia, Macedonia and Greece. 3. The power of the prefect of Italy extended beyond the country from which he derived his title, over the additional territory of Rhætia, as far as the banks of the Danube, over the dependent islands of the Mediterranean, and over that part of the continent of Africa, which lies between the confines of Cyrene and those of Tingitania. 4. The prefect of the Gauls comprehended under that denomination the hundred provinces of Britain and Spain; and his authority was obeyed from the wall of Antoninus to the foot of mount Atlas.

Thus the office of prefect of the prætorium, which in its origin, and till the time of Constantine, was military, and succeeded to that of *magister equitum*, now commenced a purely civil magistrature; and at length became the prime dignity of the empire.

The succeeding emperors, following Constantine's division, divided the empire into four prefectures prætorii, as into four dioceses; viz. the Gauls, Illyria, Italy, and the East. See DIOCESE.

The provinces of which these dioceses consisted, had their particular governors; at the head of whom was the prefect, who, though he had not the command of the army, yet had the power of the sword, decided ultimately of all causes, and had all the marks and honours of sovereignty.

Although the prætorian prefects had been deprived of all military command, the civil functions which they exercised over so many subject nations, were adequate to the ambition and abilities of the most consummate ministers. To their wisdom was committed the supreme administration of justice and of the finances, the former including the protection of citizens who were obedient to the laws, which in a state of peace is the distinguishing duty of the sovereign, and the latter, which pertains to the duty of the people, and comprehends the constitution of such a share of their property as is required for the expences of the state. The coin, the highways, the posts, the granaries, the manufactures;—whatever could interest the public prosperity, was moderated by the authority of the prætorian prefects. As the immediate representatives of the imperial majesty, they were empowered to explain, to enforce, and, on some occasions, to modify, the general edicts by their discretionary proclamations. They watched over the conduct of the provincial governors, removed the negligent, and inflicted punishments on the guilty. From all the inferior jurisdictions an appeal in every matter of importance, either civil or criminal, might be brought before the tribunal of the prefect; but his sentence

sentence was not final and absolute; and the emperors themselves refused to admit any complaints against the judgment or the integrity of a magistrate whom they honoured with such unbounded confidence. His appointments were suitable to his dignity; and if avarice was his ruling passion, he enjoyed frequent opportunities of collecting a rich harvest of fees, presents and perquisites. Although the emperors no longer dreaded the ambition of their prefects, they were attentive to counterbalance the power of this great office by the uncertainty of its duration. From their superior importance and dignity, Rome and Constantinople were alone excepted from the jurisdiction of the prætorian prefects.

Justinian created a fifth prefect of the pretorium for the government of Egypt or Africa, which had been torn off from the diocese of the East by the invasion of the Vandals during the empire of that prince, and allowed him a salary of 100 pounds of gold.

Under Augustus, the officer sent to govern Egypt with a proconsular authority, was called *præfectus Augustalis*. There were also several other officers distinguished by this appellation: such as *præfectus ararii*, ordained by Augustus to supervise and regulate the public fund, which he raised for the maintenance of the army; the *præfectus alæ*, appointed by the Roman consul to govern each principal division of the allies; the *præfectus classis*, or admiral; the *præfectus fabrum*, who had the care of the arms, and of every thing that related to military expeditions; the *præfectus frumenti*, appointed by Augustus to inspect and regulate the distribution of corn among the common people; the *præfectus militum*, to which class belonged three different officers, viz. the prefect of a cohort, of a camp, and of a legion; the *præfectus vigiliæ*, appointed by Augustus to command the soldiers who watched the city, and whose business was to take cognizance of thieves, incendiaries, idle vagrants, &c. and to punish all petty misdemeanours that were thought too trivial to fall under the notice of the prefect of the city, &c.

PREFECT of the Sacred Chamber. See PRÆPOSITUS.

PREFECTURES, or PREFECTURÆ, were certain towns of Italy, whose inhabitants had the title of Roman citizens; but were allowed to enjoy neither their own laws nor magistracies, being governed by annual prefects sent from Rome. These were generally such places as were either suspected, or had some way or other incurred the displeasure of the Roman state; this being accounted the hardest condition that was imposed on any people of Italy.

PREFIX, in *Grammar*, denotes letters or syllables prefixed to words: these are common in the Hebrew, and opposed to affixes.

Nouns that are formed from verbs, by the prefixion or addition of servile letters, are distinguished by the technical name of "Heemantic," because the letters which compose the word *קנינין*, *credidi*, are employed in their formation. To these might be added the letter *ך*. See SERVILE.

PREGADI, in *History*, a denomination given to the senate of Venice, in which resides the whole authority of the republic.

At its first institution it was composed of sixty senators, to whom sixty more have been added.

PREGARTIN, in *Geography*, a town of Austria; eight miles N.E. of Steyregg.

PREGEL, a river of Prussia, formed by the union of the Inster and Angerap, which, passing by Welau, Tapiau, Königsberg, &c., runs into the Frisch Haff, five miles below Königsberg, N. lat. 54° 42'. E. long. 20° 27'.

PREGNANCY, the state of a woman who has con-

ceived, or is with child. See GESTATION, CONCEPTION, and BREEDING.

From the original use of the word pregnant, is derived the act of impregnating, in its more general application. See GENERATION, FLOWER, and SEED.

PREGNANCY, *Plea and Trial of*, in *Law*. See *Jury of MATRONS*, and REPRIEVE.

PREGNANT. *Negative PREGNANT*, in *Law*. See NEGATIVE.

PREGNITZ, in *Geography*. See PÆGNITZ.

PREGUISAS, a river of Brasil, which runs into the Atlantic, S. lat. 2° 26'. W. long. 44° 26'.

PREGUNZWOLA, a town of Italy, in the Trevisan; four miles S. of Treviso.

PREHNITE, in *Mineralogy*, a stone of the siliceous genus, and quartz family, which has been denoted by various names; being called by some green shorl, and by others emerald, præsium, or chryso-præsium, and also felspar, chrysolite, and zeolite of the Cape. Its colour is apple-green, or greenish-grey, of various degrees of intensity. Its external lustre, 2. Its internal less, and of the pearly kind. Its transparency, 3.2. This stone is found both amorphous and crystallized; the former presents either a foliated or striated texture, and the crystallized forms either low, small, compressed, flat, quadrangular prisms, or tables, and some with truncated angles, and heaped together, or in groups. The principal fracture is foliated, seldom striated: the cross fracture uneven and fine-grained: its hardness from 9 to 10: brittle: its specific gravity 2.9423. Exposed to the blow-pipe, it swells and foams when heated to redness more than zeolites do, and melts into a brown enamel, smooth on the outside, but spongy and porous underneath. Of the usual fluxes borax is the most effectual; with alkalies it forms only an enamel, but microcosmic salt forces it into an opalescent glass.

By the analysis of Mr. Klaproth, it contains 0.4383 siliceous, 0.3033 argill, 0.1833 calx, 0.0566 iron, and 0.01830 water and air.

By that of Mr. Hassenfratz, 0.50 siliceous, 0.204 argill, 0.233 calx, 0.049 iron, 0.009 water, and 0.005 magnesia.

This stone was first found near the Cape of Good Hope, by Capt. Pehrén, and hence Mr. Werner called it prehnite. It has been lately discovered near Dumbarton in Scotland, and it has also been found in Dauphiné.

In lustre, texture, and intumescence, it resembles zeolites, but differs in hardness, specific gravity, colour, relation to fluxes; and also in constitution, for it contains iron; neither does it gelatinate with acids as zeolites do. On the other hand, it differs from shorls, by its fracture, intumescence when heated, greater fusibility, and the porosity of its enamel. Hence Mr. Werner justly considers it as a particular species, but nearly allied to zeolite. Kirwan's Elem. vol. i. See GEMS.

PREIS, JOACHIM FREDERIC, in *Biography*, Swedish ambassador at the Hague, was born in 1660, at Dorpt, in Esthonia, being the youngest of sixteen children. Having received a good education, partly at home, and partly at the royal school at Riga, he was fitted for public life. In 1689 he repaired to Stockholm, and was presented to Charles XI., who gave him reason to hope that he should soon be employed in some public capacity. Encouraged by this prospect, he determined to travel, in order that he might improve himself by a more extensive acquaintance with mankind. After passing some time in Germany, Holland, and England, he went to Paris in 1695, where he turned his attention entirely to diplomatic affairs, and entered into the service of Palmquist, the Swedish ambassador at the French court, assisting in the duties of the office without any regard

to emolument. In 1703, when Palmquist was appointed by Charles XII. envoy-extraordinary to the Hague, Preis accompanied him thither as secretary, and on Palmquist's being promoted to be chancellor of the court in 1715, he was acknowledged by the states-general as charge d'affaires, without obtaining special letters of credence. The misfortunes into which Sweden had fallen at this period, rendered his situation exceedingly critical and delicate, being often obliged to act according to the circumstances of the moment, without orders or instructions. The arrest of baron Goertz in Holland, contrary to the law of nations, threw Preis into a considerable dilemma, nevertheless he conducted himself with so much address, that he obtained the release of Goertz, though he thereby excited the displeasure of the Dutch minister, who did all in his power to induce Charles XII. to recall him. The attempt did not succeed, the king returning for answer, that "he found his services still necessary." Peter the Great, when at Amsterdam, was desirous to engage Preis in his service, as being a native of Esthonia, and with this view signified that he wished to have a conference with him; but, to the czar's great astonishment, he declined his visit and offer. On the death of Charles XII., this statesman was treated with the same respect by his successor queen Ulric Eleonora, who in 1719 appointed him her resident with the states-general, and in the year following he was confirmed in that quality by king Frederic. In the year 1745 he received letters patent of nobility; in 1748 he was created a knight of the Polar Star; and in 1756 was raised to the rank of baron. He died in the year 1759, having served his country, under five different sovereigns, for seventy years, of which he had been employed fifty-seven in the republic of the United States. Baron Preis possessed a sound judgment, added to great penetration. He was of a serious disposition, but easy in his manners, and could readily adapt his behaviour to that of the persons with whom he was in company. Till a late period in life he applied to business with indefatigable exertion, and his vigilance was directed to every object connected with the department to which he belonged. In his public and private actions, he was guided by the principles of religion, and the integrity of his heart was manifested in every act of his life. He was greatly attached to literary pursuits, and courted the society of learned men, whatever might be their condition, and the hurry of business seldom prevented him from devoting some part of his time to study. His own works were numerous, of which the following may be noticed; "Lettre d'un Ami à Dantzic à un Ami à Amsterdam," 1714. "Seconde Lettre d'un Ami à Dantzic à un Ami à Amsterdam, ou l'on montre que la prétendue Liberté de Navigation, et de Commerce, sur les Villes Suedoises occupées par les Russes, est mal fondée." "Lettre de M. N. N. à une Personne de Distinction qui lui demande ses Sentimens sur les Imprimées qui ont paru au Sujet de l'Arret du Comte de Gyllenborg et Baron de Goertz, Ministres du Roi de Suede." Gen. Biog.

PREISEGG, in *Geography*, a town of Austria: 18 miles S.S.W. of Steyr.

PREISENDORF, a town of Bavaria, in the bishopric of Bamberg; three miles S. of Bamberg.

PREJUDICE, PRÆJUDICIUM, a false notion or opinion of any thing, conceived without a due previous examination thereof.

Prejudice, *q. d.* pre-judgment, does not import a judgment merely as prior to another in respect of time, but as being prior thereto in respect of knowledge, or of sufficient attention to the thing; the preposition *præ* expressing an

anticipation, not so much of time, as of knowledge and due attention.

Hence prejudice is also called among the schoolmen *anticipatio, et præventa cognitio*, a preconceived opinion, &c.

Prejudices which lead to wrong judgments, or which are causes of error, may be considered as disorders of the understanding; the investigation and statement of which may serve to point out appropriate and effectual remedies. Lord Bacon, in his fifth book "De Augmentis Scientiarum," and more fully in his "Novum Organum," has distributed them into four classes, under appellations that are somewhat fanciful; *viz.* "idola tribus," "idola specus," "idola fori," and "idola theatri." To every bias of the understanding, by which a man may be misled in judging, or drawn into error, he gives the name of an idol; the propriety of which may be illustrated and evinced by considering, that the understanding, in its natural and best state, pays its homage only to truth; and the causes of error are regarded by him as so many false deities, who receive the homage that is due only to truth.

The *first* class comprehends the "idola tribus," which beset the whole human species, so that every man is in danger from them; such are exemplified in the following instances: 1. Men are prone to be led too much by authority in their opinions; and when this bias commences with an indifference about truth, its operation will be the more powerful. 2. Another general prejudice rises from a disposition to measure things less known, and less familiar, by those that are better known, and more familiar. This is the foundation of analogical reasoning, to which we are naturally prone, and to which indeed we owe a great part of our knowledge; at the same time it ought to be considered, that the bias of human nature is to judge from too slight analogies. 3. Men are often led into error by the love of simplicity, which disposes them to reduce things to few principles, and to conceive a greater simplicity in nature than there really is. 4. One of the most copious sources of error in philosophy, is the misapplication of our noblest intellectual power, which is that of invention, to purposes for which it is incompetent. 5. In avoiding one extreme, men are very apt to rush into the opposite. 6. Men's judgments are often perverted by their affections and passions.

The *second* class of idols, according to lord Bacon, are the "idola specus:" these are prejudices which have their origin, not from the constitution of human nature, but from something peculiar to the individual. Conceiving the mind of every man to resemble a cave, which has its particular form, and manner of being enlightened, and which, from these circumstances, often gives false colours, and a delusive appearance to objects that are from it, lord Bacon gives the name of "idola specus" to those prejudices which arise from the particular way in which a man has been trained, from his being addicted to some particular profession, or from something particular in the turn of his mind.

The "idola fori" are the fallacies arising from the imperfections and the abuse of language, which is an instrument of thought, as well as the communication of all thoughts.

The *fourth* class of prejudices are the "idola theatri," by which are meant prejudices arising from the systems or sects, in which we have been trained, or which we have adopted. See Reid's Essays on the Intellectual Powers of Man, *ess. vi.*

PREJUDICIAL ACTION. See ACTION.

PRELA, in *Geography*, a town of the principality of Oneglia; eight miles N.W. of Oneglia.

PRELATE, from *prælatus*, of *præ*, before, and *fero*, I bear,

bear, carry, an ecclesiastical superior, raised to some eminent and superior dignity of the church.

Patriarchs, primates, archbishops, bishops, generals of religious orders, certain croziered and mitred abbots, and even deans and archdeacons, are ranked among the number of prelates.

PRELATE of the Garter, is the first officer of that noble order, and is as ancient as the institution itself.

William de Edynton, then bishop of Winchester, was the first prelate at the erection of the order; and it has been continued in that see ever since.

It is an office of great honour, but has neither salary nor fees; only a convenient lodging allowed in Windsor-castle; and as oft as the prelate comes thither (by the sovereign's command), he is to have court-livery allowed for himself and servants. See GARTER.

PRELIMINARY, or PRÆLIMINARY, formed from *præ, before*, and *limen, threshold*, something to be examined, dispatched or determined, before an affair can be treated of thoroughly, and to purpose.

Preliminaries of peace generally take up the greatest part of treaties. They consist in examining of powers, qualities of princes, ranks of ambassadors, &c.

PRELIZ, in *Geography*, a river which rises in Carinthia, and runs into the Moehr, in the bishopric of Salzburg.

PRELUDE, in *Music*, a short symphony or flight of fancy, which serves as a preface or introduction and preparation to a regular composition. Thus, the overture of an opera is a prelude; as are the first symphonies of songs.

PRELUDE is still further a trait of melody or harmony, to try if an instrument is in tune. (See TOCCATA.) To prelude, is in general to play or sing some irregular flights of fancy, in passing through the principal chords of a key, either for exercise, or to prepare the voice or hand before the beginning of a piece of music.

But upon the organ, or other keyed instrument, the art of preluding is more considerable; it is composing or playing extempore whole pieces, replete with every thing that is most learned and curious in composition, design, in fugue, in imitation, in modulation, and in harmony.

It is above all in preluding and giving way to the imagination, that great masters, exempt from the extreme subserviency to rules which the eyes of critics require in written music, display those talents of invention and execution which ravish all hearers far beyond the written labours of meditation and study.

PREM, in *Geography*, a town of Istria; 16 miles N.N.E. of Pedena.—Also, a town of Austria; seven miles W.S.W. of Glaggnitz.—Also, a town of the duchy of Carniola; 17 miles E.N.E. of Trieste; called also *Brem*.

PRÉMAUX, a town of France, in the department of the Côte d'Or, celebrated for its wine, and having in its vicinity a medicinal spring; three miles S.W. of Nuits.

PREMELIOS, a town of Italy, in Friuli; three miles S.W. of Friuli.

PREMERY, a town of France, in the department of the Nièvre, and chief place of a canton, in the district of Cosne; 14 miles N.E. of Nevers. The place contains 1430, and the canton 8449 inhabitants, on a territory of 252½ kilometres, in 14 communes.

PRÉMIA, a town of Spain, near the coast of Catalonia; four miles S.W. of Matara.

PREMIER SERJEANT, in *Law*. See COUNSEL and PRÉCÉDENCE.

PREMIER Point, in *Geography*, a cape on the S. coast of the island of Bourbon. S. lat. 24° 40'.

PREMIERE VUE, a small island on the N. coast of New Georgia, on the land of the Arfacides, discovered by M. Surville in 1769. S. lat. 7° 15'. E. long. 157° 17'.

PREMIERES. See PRIMEIRAS.

PREMISES, PREMISES, *Præmissæ*, in *Logic*, the two first propositions of a syllogism.

When a syllogism is in form, the two premises being granted, the conclusion cannot be denied.

The premises, says Chauvin, are properly the parts of the antecedent of an argument, when complex; and are called *præmissæ*, because premised to the conclusion.

Thus in the argument, *every man is an animal, Peter is a man, therefore Peter is an animal*: the propositions, *every man, &c.* and *Peter, &c.* are the premises.

Premises are the principles of our reasonings; as being clear, evident, and demonstrative propositions, from the relations of which to one another we draw or infer new truths, propositions, &c.

The premises are either *equal*, where neither suffices alone for drawing a conclusion, as in the instance above; or *unequal*, the one *major, greater*, from which alone the conclusion is drawn; the other *minor, or less*, which only serves in applying the antecedent to the consequent.

In the common practice of the schools, however, every syllogism, or formal argument, of what kind soever, is said to have a *major* and a *minor*, how equal soever the premises may be.

PREMISES, in *Law*, the lands, &c. mentioned in the preamble or beginning of a deed, lease, conveyance, or the like.

The premises of a *deed* (which see) may be used to set forth the number and names of the parties, with their additions or titles. They also contain the recital, if any, of such deeds, agreements, or matters of fact, as are necessary to explain the reasons upon which the present transaction is founded; and herein is also set down the consideration upon which the deed is made. And then follows the certainty of the grantor, grantee, and thing granted.

PREMIUM, or PRÆMIUM, literally denotes a reward or recompence.

Among merchants it is taken for that sum of money; viz. 8 or 10 *per cent.* &c. which is given to an insurer, for insuring the safe return of any ship or merchandise.

In a policy of insurance, the insurers bind themselves to the insured for the true performance of their contract, and confess themselves paid the consideration or premium by the insured, after the rate specified. In practice, however, the premium is not always paid, when the policy is underwritten. Insurances are generally effected by the intervention of brokers, and open accounts are usually kept between them and the underwriters, in which they make themselves debtors for all premiums. By the usage of trade, the insurer is to look to the agent who is employed to effect the policy for his premium. Sometimes the credit is given to the insured himself.

If there be no express agreement, it would seem that the agent or broker is *prima facie* liable. Perhaps in such case an action would lie against either, unless the principal has paid the premium to the agent; in which case, the writers on this subject are of opinion that the agent alone is responsible. But whichever is liable, the insurer may recover the premium, and "indebitatus assumpsit" will lie for it, notwithstanding the formal acknowledgment of the receipt of it in the policy, which is not inserted there as conclusive evidence of the actual payment of the premium, but to preclude the necessity of proving it in case of loss. The payment

ment or non-payment of the premium can, therefore, have no effect on the insurance. Every insurer may insist on being paid the premium before he subscribes the policy; but having once subscribed it, and given credit for the premium, to whom being of no consequence, he shall not afterwards be at liberty, when a loss has happened, to object the want of consideration for his promise. There is no fixed rule for ascertaining the premium in any case. This must always depend on the agreement of the parties; and therefore the premium, whatever it may be, is always reputed to be just and fair, if there be no fraud or surprise on either side. If the nature of the risk be fairly and fully declared by the insured, the insurer can never dispute the payment of a loss, on the ground of the smallness of the premium.

The premium paid by the insured, and the risk which the insurer takes upon himself, are correlatives, the mutual operation of which constitutes the essence of the contract of insurance. The insurer shall not be liable to the risk, without receiving the premium; nor shall he retain the premium, which was the price of the risk, if, in fact, he runs no risk at all. In such case he is bound, upon principles of moral honesty and justice, to refund it; and the law implies a debt, "quasi ex contractu," and gives the insured an action against the insurer to recover back the premium. The cases in which the insured shall be entitled to a return of premium are reduced, by serjeant Marshall, to the following heads: *viz.* where the contract is void *ab initio*; where the risk has not been commenced; upon the performance of certain stipulations; and where the deduction of one-half *per cent.* shall be allowed.

The contract may be void for want of interest, which may be either *total*, as where the insured has nothing on board the ship, or *partial*, as where he has an interest in the thing insured, but not to the amount stated in the policy. Upon a wager-policy, which since the stat. 19 Geo. II. c. 37. is illegal and void, the insured cannot recover back the premium, at least after the risk is run. Yet, before the risk is run, and while the contract is executory, the insured may recover back the premium. If the contract be void, as being a re-insurance within the statute 19 Geo. II. c. 37. § 4. there shall be no return of premium. The case is the same, if the insurer could have been called upon to pay the sum insured. Captors likewise having insurable interest in their prize before condemnation, if they insure, shall not have a return of premium, though it should afterwards be adjudged no prize. Although an insurance to protect a trading with the enemy is void, yet the insured shall not recover back his premium. Where the policy is void, and no fraud is imputable to the plaintiff, he is entitled to a return of premium; and when the plaintiff is entitled to a return of premium, he may claim a verdict for it, even after the jury have delivered their verdict for the defendant, on the principal question; but the court will not, on setting aside a verdict for a loss, substitute a verdict for the premium. If the policy be void, on account of fraud on the part of the insurer, the premium shall be returned; but whether the insurer be bound to return the premium, in a case where fraud has been committed by the insured, is a question that has occasioned some doubt and difference of opinion. The court of chancery, however, has in two instances ordered a return of premium, where the policies were declared void for fraud committed by the insured. The same doctrine has been adopted in a court of law. Nevertheless, the courts of law, under the sanction of lord Mansfield, have held a contrary doctrine.

With regard to the second head, where the risk has not

been commenced, foreign authors maintain, that the insured cannot, by his own act, dissolve the contract, and demand a return of premium; excepting only the case, in which it becomes impossible for the insured to ship the goods, or to cause the ship to proceed on her voyage. In Holland and France the law is different; and in England it is a general rule, that if the risk be not begun, whatever be the cause, the premium shall be returned; but where the voyage and premium are divisible, and any part be not commenced, the premium for that part shall be returned. But if the risk be entire, and be once commenced, it is a general rule that there shall be no return of premium.

The third head relates to the performance of some stipulation. If part of the premium is to be returned upon the performance of some stipulation, as in case of a ship's sailing with convoy, this shall be returned, though the insurer be obliged to pay a partial loss.

With regard to the fourth head it is observed, that, as the insurer can never, by his own act, discharge himself from the contract, it seems reasonable that, where the insured thinks proper to put a stop to the adventure, and prevent the risk from ever commencing, he should make some compensation to the insurer for his trouble and disappointment; it is, therefore, the general custom, in all the maritime countries of Europe, to allow him to retain one-half *per cent.* This, according to Emerigon and Le Guidon, is a consideration to the insurer for his trouble in signing the policy, and making the proper entry in his books. This is allowed to the insurer, where the contract is void for some radical defect, provided this was unknown to him when he entered into the contract. But if he was informed of the fault, or must have known it before he subscribed the policy; as if he were to insure a ship or goods, when he hears of their safe arrival, or seamen's wages, or contraband goods, knowing them to be such, he could have no claim to this allowance. Pothier holds, that if the contract becomes void, not by the act of the insured, but by some cause which he could not prevent or controul, the insurer shall not be entitled to the half *per cent.* Emerigon, on the contrary, maintains that in all cases where the policy becomes void, without any fraud on the part of the insurer, he shall have this allowance. Marshall's Treatise on the Law of Insurance, London, 1802. See POLICY.

PREMIUM is also used, in the money and paper-trade, for what is given for a thing above *par*.

Thus lottery-tickets, &c. are said to bear so much, *e. gr.* 10s. or 20s. premium, when they are sold for so much beyond the prime cost, at which the government issued them.

PREMNA, in *Botany*, an unmeaning name, taken from *πρεμνος*, a plant, branch, or stem.—Linn. Mant. 154. Schreb. 413. Willd. Sp. Pl. v. 3. 314. Mart. Mill. Dict. v. 3. Brown Prodr. Nov. Holl. v. 1. 512. Juss. 107. Lamarck Illustr. t. 543. Gærtn. t. 56.—Class and order, *Didynamia Angiospermia*. Nat. Ord. *Personata*, Linn. *Vitices*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, slightly two-lobed, permanent; the upper segment emarginate. *Cor.* of one petal, irregular, tubular; limb four-cleft, obtuse; its two upper segments shortest, erect; the others spreading. *Stam.* Filaments four, erect, of inconsiderable length, the two lowermost shortest; anthers roundish. *Pist.* Germen roundish; style cylindrical, shorter; stigma cloven. *Peric.* Berry rather globular, of four cells. *Seeds* solitary, bony, rounded at one side, angular at the other.

Eff. Ch. Calyx two-lobed. Corolla four-cleft. Berry of four cells. Seeds solitary.

A tropical genus of shrubs, with opposite, simple, entire or somewhat serrated, smooth or downy, fœtid leaves, whose scent, especially in a dried state, is compared by Mr. Brown to that of *Chenopodium olidum*. The flowers are small, terminal; the branches of their cymose panicles opposite and forked. Corolla whitish.

Linnæus describes two species.

P. integrifolia. Linn. Mant. 252. (*Cornutia corymbosa*; Burm. Ind. 132. t. 41. f. 1. Folium hirci; Rumph. Amb. v. 3. 208. t. 134.)—Leaves elliptical, entire, smooth.—Native of the East Indies. Perhaps a variety of the following. Linn.

P. ferratifolia. Linn. Mant. 253. Gært. t. 56.—Leaves smooth, serrated.—From the same country, sent by Koenig. Branches round, purplish, scarred. Leaves stalked, ovate, obtuse, smooth, serrated, except towards their base. Stipulas nearly lanceolate, deciduous. Bractæas linear. Flowers the size of a *Viburnum*.

To these Willdenow adds,

P. tomentosa. Willd. n. 2. (*Cornutia corymbosa*; Lamarck Dict. v. 1. 54.)—Leaves ovate, pointed, entire, downy beneath.—Native of the East Indies. Branches yellowish; downy when young. Leaves remarkably pointed. Cyme downy, dense. Bractæas very minute.

Mr. Brown adds six more species, all found in the tropical part of New Holland, and differing from each other in the shape or downiness of their leaves, or in the density of their inflorescence. These species are named *obtusifolia*, *attenuata*, *media*, *ovata*, *acuminata*, and *cordata*.

PREMONSTRANTES, or PRÆMONSTRATENSES, a religious order of regular canons instituted in 1120, by S. Norbert; and thence also called *Norbertines*.

The first monastery of this order was built by Norbert, in the isle of France, three leagues to the west of Laon; and by him called *Præmonstre*, *Præmonstratum*, whence the order itself was denominated; though, as to the occasion of that name, the writers of that order are divided. At first, the religious of this order were so poor, that they had only a single ass, which served to carry the wood they cut down every morning, and sent to Laon, in order to purchase bread. But in a short time they received so many donations, and built so many monasteries, that, thirty years after the foundation of this order, they had above a hundred abbeys in France and Germany: and in process of time, the order so increased, that it had monasteries in all parts of Christendom, amounting to one thousand abbeys, three hundred provostships, a vast number of priories, and five hundred nunneries. But their number is now greatly diminished. The rule they followed was that of St. Austin, with some slight alterations, and an addition of certain severe laws, whose authority did not long survive their austere founder.

The order was approved by Honorius II. in 1126, and again by several succeeding popes. At first the abstinence from flesh was rigidly observed. In 1245, Innocent IV. complained of its being neglected, to a general chapter. In 1288, their general, William, procured leave of pope Nicholas IV. for those of the order to eat flesh on journies. In 1460, Pius II. granted them a general permission to eat meat, excepting from Septuagesima to Easter.

The religious of this order are clothed in white, with a scapulary before the cassock. Out of doors they wear a white cloak and white hat; within, a little camail; and at church, a surplice, &c.

In the first monasteries built by Norbert, there was one for men, and another for women, only separated by a wall. In 1137, by a decree of a general chapter, this practice was prohibited, and the women removed out of those already built, to a greater distance from those of the men.

The *Præmonstratenses*, or monks of *Premontre*, vulgarly called white canons, came first into England A.D. 1146. Their first monastery, called New-house, was erected in Lincolnshire, by Peter de Saulia, and dedicated to St. Martial. In the reign of Edward I. this order had twenty-seven monasteries in England. They had in England a conservator of their privileges, but were nevertheless often visited by their superiors at *Premontre*, and continued under their jurisdiction till the year 1512, when they were exempted from it by the bull of pope Julius II., confirmed by king Henry VIII.; and the superiority of all the houses of this order in England and Wales was given to the abbot of Welbeck, in Nottinghamshire. It is said there were about thirty-five houses of this order.

PREMOTION, PRÆMOTIO, in the Schools, the action of God co-operating with the creature, and determining him to act. See PREDETERMINATION.

Physical premotion, according to Alvarez, Lemos, &c. is a complement of the active power, whereby it passes from the first act to the second, *i. e.* from a complete, and next power to action. It is an influence or participation of the virtue of the first cause, which makes the second cause actually active.

PREMSKAIA, in *Geography*, a river of Russia, which runs into the Kama, 32 miles W. of Gerdin, in the government of Perm.

PREMSTOLLEN, a town of the duchy of Stiria; 5 miles S.S.W. of Gratz.

PREMUNIENTES, in *Law*, writs formerly dispatched to each bishop to call them to parliament, warning them to bring with them the deans and archdeacons, one proctor for each chapter, and two for the clergy of his diocese.

PREMUNIRE, PRÆMUNIRE, a term used for an offence, for a writ granted thereupon, and for the punishment thereof.

The word is a corruption of the Latin *præmonere*, *q. d.* to forewarn, or bid the offender take care; of which a reason may be drawn from the words of the statute 27 Edw. III. cap. 1. and the form of the writ, “Præmunire facias præfatum propositum, & J. R. procuratorem, &c. quod tunc sint coram nobis.”

In order to understand properly the occasion and origin of præmunire, it will be necessary to trace out briefly the rise and progress of the papal usurpations in England. The conversion of the Saxons in this country to the profession of Christianity, after they had driven the Christians of the ancient British church to the remotest corners of our island, was effected by Augustin the monk, and other missionaries from the court of Rome: and this naturally introduced some few of the papal corruptions in point of faith and doctrine: but we read of no civil authority claimed by the pope in these kingdoms, till the era of the Norman conquest, when the reigning pontiff, having favoured duke William in his projected invasion, by blessing his host, and consecrating his banners, took that opportunity also of establishing his spiritual encroachments, which the policy of the conqueror allowed, in order more effectually to humble the Saxon clergy and aggrandise his Norman prelates. Hence his legates *à latere* were introduced into England to hear and determine ecclesiastical causes; and in the reign

of Henry I. he assumed the disposal of most of the bishoprics, abbeyes, and other ecclesiastical benefices, by mandates or bulls, called *expectative graces*, and *provisions*, before they became void; in the reign of king Stephen, appeals to the court of Rome were established; under Henry II. the pope claimed exemption of clerks from the secular power; and in the time of king John, pope Innocent III. obtained a resignation of his crown to the pope, and compelled him to accept his kingdom from the pope's donation, holding it as a vassal of the holy see, at the annual rent of a thousand marks. Many circumstances concurred, and many contrivances were made use of to extend and establish the papal power in this kingdom.

King Edward I., a wise and magnanimous prince, set himself in earnest to shake off this servile yoke; and in the thirty-fifth year of his reign was made the first statute against papal provisions, which, according to sir Edward Coke, is the foundation of all the subsequent statutes of præmunire.

In the weak reign of Edward II. the pope again endeavoured to encroach, but the parliament resolutely withstood him: and in the reign of Edw. III. several penal laws were enacted against provisors; 25 Edw. III. stat. 6. 27 Edw. III. stat. 1. cap. 1. 38 Edw. III. st. 1. cap. 4. and stat. 2. cap. 1, 2, 3, 4. which ordained, that the court of Rome should present or collate to no bishopric or living in England; and that whoever disturbed any patron in the presentation to a living by virtue of a papal provision, such provisor should pay fine and ransom to the king at his will, and be imprisoned till he renounced such provision; and the same punishment was inflicted on such as cited the king, or any of his subjects, to answer in the court of Rome. And when the holy see resented these proceedings, and pope Urban V. attempted to revive the vassalage and annual rent to which king John had subjected his kingdom, it was unanimously agreed by all the estates of the realm in parliament assembled, (40 Edw. III.) that king John's donation was null and void, being without the concurrence of parliament, and contrary to his coronation oath; and all the temporal nobility and commons engaged, that if the pope should endeavour by process or otherwise to maintain these usurpations, they would resist him with all their power.

In the reign of Richard II. it was found necessary to strengthen these laws, and, therefore, it was enacted by stat. 3 Ric. II. cap. 3. and 7 Ric. II. cap. 12. first, that no alien should be capable of letting his benefice to farm; and, afterwards, that no alien should be capable of being presented to any ecclesiastical preferment, under the penalty of the statute of provisors. By the statute 12 Ric. II. cap. 15. all liegemen of the king, accepting of a living by any foreign provision, are put out of the king's protection, and the benefice made void. To which the statute 13 Ric. II. cap. 2. st. 2. adds banishment and forfeiture of lands and goods; and by cap. 3. of the same statute, any person bringing over any citation or excommunication from beyond sea, on account of the execution of the foregoing statutes of provisors, shall be imprisoned, forfeit his goods and lands, and moreover suffer pain of life and member.

In the writ for the execution of all these statutes, the words *præmunire facias*, being used to command a citation of the party, have denominated, in common speech, not only the writ, but the offence itself of maintaining the papal power, by the name of præmunire. And, accordingly, the next statute, 16 Ric. II. cap. 5. usually called the

statute of præmunire, and generally referred to by all subsequent statutes, enacts, that whoever procures at Rome, or elsewhere, any translations, processes, excommunications, bulls, instruments, or other things which touch the king, against him, his crown and realm, and all persons aiding therein, shall be put out of the king's protection, their lands and goods forfeited to the king's use, and they shall be attached by their bodies to answer to the king and his council; or process of *præmunire facias* shall be made out against them, as in other cases of provisors. By the statute 2 Hen. IV. cap. 3. all persons who accept any provision from the pope, to be exempt from canonical obedience to their proper ordinary, are also subjected to the penalties of præmunire; and this is the last of our ancient statutes touching this offence.

Such is the original meaning of the offence, which we call præmunire; viz. introducing a foreign power into this land, and creating *imperium in imperio*, by paying that obedience to papal process, which constitutionally belonged to the king alone, long before the reformation in the reign of Henry VIII.; at which time the penalties of præmunire were indeed extended to more papal abuses than before; as the kingdom then entirely renounced the authority of the see of Rome, though not all the corrupted doctrines of the Roman church. And, therefore, by the several statutes of 24 Hen. VIII. cap. 12. and 25 Hen. VIII. cap. 19. and 21. to appeal to Rome from any of the king's courts; to sue to Rome for any licence or dispensation; or to obey any process from thence, are made liable to the pains of præmunire. And, in order to restore to the king in effect the nomination of vacant bishoprics, and yet keep up the established forms, it is enacted by statute 25 Hen. VIII. cap. 20. that if the dean and chapter refuse to elect the person named by the king, or any archbishop or bishop to confirm or consecrate him, they shall fall within the penalties of the statutes of præmunire. Also, by stat. 5 Eliz. cap. 1. to refuse the oath of supremacy will incur the pains of præmunire; and to defend the pope's jurisdiction in this realm is a præmunire for the first offence, and high treason for the second. So, too, by statute 13 Eliz. cap. 2. to import any *Agnus Dei*, crosses, beads, or other superstitious things, pretended to be hallowed by the bishop of Rome, and tender the same to be used; or to receive the same with such intent, and not discover the offender; or if a justice of the peace, knowing thereof, shall not within fourteen days declare it to a privy-counsellor; they all incur a præmunire.

Farther, to contribute to the maintenance of a Jesuit's college, or any popish seminary whatever, beyond sea; or any person in the same; or to contribute to the maintenance of a Jesuit or Popish priest in England; is by statute 27 Eliz. cap. 2. made liable to the penalties of præmunire.

Thus far, says judge Blackstone, the penalties of præmunire seem to have kept within the bounds of their original institution, viz. the depressing the power of the pope; but it was afterwards thought fit to apply those penalties to other heinous offences. Thus, 1. By the statute 1 & 2 Phil. & Mary, cap. 8. to molest the possessors of abbey lands granted by parliament to Henry VIII. and Edward VI. is a præmunire. 2. So likewise is the offence of acting as a broker or agent in any usurious contract, where above 10 per cent. interest is taken, by statute 13 Eliz. cap. 10. 3. To obtain any stay of proceedings, other than by arrest of judgment, or writ of error, in any suit for a monopoly, is likewise a præmunire, by statute 21 Jac. I. cap. 3. 4. To obtain an exclusive patent for the

sole making or importation of gunpowder or arms, or to hinder others from importing them, is also a præmunire by two statutes; the one 16 Car. I. cap. 21, the other 1 Jac. II. cap. 8. 5. On the abolition, by statute 12 Car. II. cap. 24. of purveyance, and the prerogative of pre-emption, or taking any victual, beasts, or goods for the king's use, at a stated price, without consent of the proprietor, the exertion of any such power for the future was declared to incur the penalties of præmunire. 6. To assert, maliciously and advisedly, by speaking or writing, that both or either house of parliament have a legislative authority without the king, is declared a præmunire by statute 13 Car. II. cap. 1. 7. By the habeas corpus act also, 31 Car. II. cap. 2. it is a præmunire, and incapable of the king's pardon, besides other heavy penalties, to send any subject of this realm a prisoner into parts beyond the seas. 8. By the statute 1 W. & M. stat. 1. cap. 8. persons of eighteen years of age refusing to take the new oaths of allegiance, as well as supremacy, upon tender by the proper magistrate, are subject to the penalties of a præmunire; and by stat. 7 & 8 W. III. cap. 24. serjeants, counsellors, proctors, attornies, and all officers of courts, practising without having taken the oaths of allegiance and supremacy, and subscribing the declaration against popery, are guilty of a præmunire, whether the oaths be tendered or no. 9. By the statute 6 Ann. cap. 7. to assert maliciously and directly, by preaching, teaching, or advised speaking, that the then pretended prince of Wales, or any person other than according to the acts of settlement and union, hath any right to the throne of these kingdoms; or that the king and parliament cannot make laws to limit the descent of the crown; such preaching, teaching, or advised speaking is a præmunire; as writing, printing, or publishing the same doctrines amount to high treason. 10. By statute 6 Ann. cap. 23. if the assembly of peers of Scotland, convened to elect their sixteen representatives in the British parliament, shall presume to treat of any other matter save only the election, they incur the penalties of a præmunire. 11. The statute 6 Geo. I. cap. 18. the year after the infamous South Sea project had beggared half the nation, makes all unwarrantable undertakings by unlawful subscriptions, then commonly known by the name of bubbles, subject to the penalties of a præmunire. 12. The statute 12 Geo. III. c. 11. subjects to the penalties of the statute of præmunire all such as knowingly and wilfully solemnize, assist, or are present at, any forbidden marriage of such of the descendants of the body of king George II. as are by that act prohibited to contract matrimony without the consent of the crown.

The punishment of præmunire is thus summed up by sir Edward Coke, that, from the conviction, the defendant shall be out of the king's protection, and his lands and tenements, goods and chattels, forfeited to the king; and that his body shall remain in prison at the king's pleasure, or (as other authorities have it) during life. (1 Bulst. 199.) And so odious, adds the same author, was this offence of præmunire, that a man who was attainted of the same might have been slain by any other man without danger of law; because it was provided by law (stat. 25 Edw. III. stat. 5. cap. 22.) that any man might do to him as to the king's enemy; and any man may lawfully kill an enemy. But to obviate such mistaken and savage notions, the statute 5 Eliz. cap. 1. provides, that it shall not be lawful to kill any person attainted in a præmunire, any law, statute, opinion, or exposition of law to the contrary notwithstanding. However, such delinquent, though protected as a

part of the public from public wrongs, can bring no action for private injury, how atrocious soever; being so far out of the protection of the law, that it will not guard his civil rights, nor remedy any grievance which he, as an individual, may suffer. And no man, knowing him to be guilty, can with safety give him comfort, aid, or relief. 1 Hawk. P. C. § 5. Blackst. Comm. book iv. cap. 8.

PRÆMUNIRE is now chiefly used for the punishment appointed by the statutes above-mentioned. Thus, when it is said a man for an offence shall incur a præmunire, it is meant he shall incur the penalty appointed by the statute 16 Ric. II., commonly called the statute of præmunire. It is observed, however, to the honour of our courts of law, that prosecutions for a præmunire are unheard of in them. The only instance of one to be found is in the State Trials; when the penalties of a præmunire were inflicted on some persons for refusing to take the oath of allegiance in the reign of Charles II. 2 Hargr. State Tr. 263.

PRENANTHES, in Botany, well named by Vaillant, from *πρηνος*, drooping, and *ανθος*, a flower, in allusion to the pendulous position of the unexpanded blossoms.—Linn. Gen. 401. Schreb. 528. Willd. Sp. Pl. v. 3. 1532. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 821. Ait. Hort. Kew. v. 4. 443. Pursh. 498. Juss. 168. Gærtn. t. 158.—Class and order, *Syngenesia Polygamia equalis*. Nat. Ord. *Compositæ semisflosculosa*, Linn. *Cichoraceæ*, Juss.

Gen. Ch. Common Calyx cylindrical, smooth, its scales equal in number to the florets, with a few unequal, very short, scales at its base. Cor. compound, of a nearly simple circle of florets, which are from five to eight, or more, all perfect and equal, each of one ligulate, abrupt, four-toothed petal. Stam. Filaments five, capillary, very short; anthers united into a cylindrical tube. Pist. Germen nearly ovate; style thread-shaped, longer than the stamens; stigma cloven, reflexed. Peric. none, except the cylindrical calyx, very slightly contracted at its mouth. Seeds solitary to each floret, heart-shaped. Down capillary, mostly sessile. Recept. naked.

Ess. Ch. Receptacle naked. Calyx with scales at the base. Down simple, nearly sessile. Florets in a simple row.

Seven species of *Prenanthes* are mentioned in the *Sp. Pl.* of Linnæus, and one in his *Mantissa*. Willdenow has augmented the number to thirty-three, partly from new discoveries, and partly by removing hither certain plants, which Linnæus and others had referred either to *Lactuca*, *Hieracium*, or *Crepis*. How far he may be right in some of these instances, we have not sufficient materials to judge by; but with respect to *Crepis pulchra*, see Engl. Bot. t. 2325, we cannot help dissenting from his opinion. Michaux and Pursh have added six species to those known to Willdenow, and the latter has corrected him in one or two cases.—Six species occur in the *Hortus Kewensis*.

The following will give an idea of the genus.

P. purpurea. Purple-flowered Prenanthes. Linn. Sp. Pl. 1121. Willd. n. 5. Ait. n. 1. Jacq. Austr. t. 317. (*Sonchus sylvaticus*; Ger. Em. 294.)—Florets four or five. Leaves oblong-lanceolate, toothed; glaucous beneath; heart-shaped and clasping the stem at their base.—Native of groves and thickets in Germany, Switzerland, and Italy, flowering in July and August, and making an elegant appearance amongst alpine bushes. The root is perennial. Stem erect, round, slender, leafy, two or three feet high, panicled, many-flowered. Leaves alternate, horizontal, from three to five inches long, very smooth. Flowers very numerous, crimson or purplish, drooping, on slender stalks.

P. alba. White-flowered Prenanthes. Linn. Sp. Pl. 1121. Willd. n. 12. Ait. n. 2. Sims in Curt. Mag. t. 1079.—Florets numerous. Leaves angular, somewhat hastate, toothed. Flowers drooping, clustered, paniced.—Native of North America. Hardy in our gardens, flowering in July and August. The root is perennial. Stem herbaceous, two or three feet high. Flowers plentiful, white, with a purple calyx. This plant has a peculiar and fragrant smell. The great number of florets in each calyx is an exception to the generic character, but every other part agrees with *Prenanthes*.

P. serpentina. Lion's-foot Prenanthes. Pursh n. 9. t. 24.—“Leaves toothed, rough; radical ones palmate; those on the stem pinnatifid, somewhat three-lobed, their middle segment deeply three-cleft; uppermost lanceolate. Clusters somewhat paniced, drooping. Calyx with eight scales and twelve florets.”—Native of the mountains of Virginia and Carolina.—Perennial, flowering from August to October. About two feet high. Flowers pale purple. The inhabitants know this plant by the name of Lion's-foot, and esteem it a specific for the bite of a rattlesnake. Mr. Pursh, from whose work alone all our knowledge of the present species is derived, says he was a witness of its efficacy. A man being bitten in the foot by a moccasinsnake, a species esteemed the most dangerous, an inflammation and swelling of his whole leg took place immediately. By taking inwardly the milky juice of this herb boiled in milk, and applying the steeped leaves, very frequently changed, to the wound, he was cured in a few days.

P. muralis. Wall Prenanthes, or Ivy-leaved Lettuce. Linn. Sp. Pl. 1121. Willd. n. 30. Ait. n. 6. Fl. Brit. n. 1. Engl. Bot. t. 457. Curt. Lond. fasc. 5. t. 58. Fl. Dan. t. 509. (*Sonchus laevis muralis*; Ger. Em. 293.)—Florets five. Leaves runcinate, toothed, their terminal lobe five-angled.—Native of shady groves, on a chalky soil, and often on exposed walls and cliffs, in England and other parts of Europe, flowering in July. The root is perennial, somewhat woody and knotty. Herb slender, delicate, brittle, smooth, and milky. Stem erect, twelve or eighteen inches high, round, leafy. Leaves rather glaucous, with a red or purple tinge. Panicle much divaricated, with numerous small bracteas. Flowers yellow, drooping before they expand.

PRENDER, formed from the French *prendre*, to take, in Law, a power or right of taking a thing before it is offered.

Such a thing lies in render, but not in prender. Coke's Rep. p. 1. Sir John Peter's case. See RENDER.

PRENDER *de Baron* is an exception to disable a woman from pursuing an appeal of murder against the killer of her former husband, taken from her having married a second. See APPEAL.

PRENESTINÆ SORTES. See SORTES.

PRENOMEN, PRÆNOMEN, among the Romans, a proper name, or name prefixed to the general name of the family; as Caius, Lucius, Marcus, &c.

The prenomen answers to our Christian name, Peter, Paul, &c. It was not introduced among the Romans till long time after the *nomen*.

The name of the family was given by the Romans to their children soon after their birth; but the prenomen was not given them till they took the virile habit, or about the age of seventeen years. See NAME.

Varro reckons up thirty prænomena among the Romans. The usual ones may be reduced to eighteen.

The Greeks had no prænomena; they had but one name.

PRENOTION, PRÆNOTIO, or *Præcognitio*, a notice or piece of knowledge preceding some other, in respect of time.

Such is the knowledge of the antecedent; which must precede that of the conclusion. See Common NOTIONS, and PRÆNOTION.

PRENPERG, in Geography, a town of Austria; 12 miles E.S.E. of Glaggnitz.

PRENSDORF, a town of the principality of Querfurt; two miles N. of Dahma.

PRENZLOW, an independent town of the Ucker Mark of Brandenburg, and capital of the country; also, the chief seat of the court of justice. It is large and well built, with straight and broad streets, seated on a fruitful plain on the lake and river Ucker. It is divided into the Old and New, and its corporation derives considerable revenues from the city mills, its several farms, and large woods. The judge of the numerous French colony established in this town is invested with authority over all the French colonies in the Ucker Mark. Its three convents have been alienated; but its six churches have divine service regularly performed in them. Here is a good Latin school; and the place itself carries on a very large trade in corn, cattle, and tobacco: for the last it is particularly noted, and also for its manufacture of cloth: 48 miles N.N.E. of Berlin. N. lat. 53° 17'. E. long. 13° 53'.

PREOBRAZENIJA, or *Island of Transfiguration*, an island in the North Pacific ocean, about 150 miles from the S E. coast of Russia. N. lat. 58° 30'. E. long. 175° 14'.

PREOBRAZENSKOI, a town of Russia, in the government of Upha; 92 miles E. of Orenburg.

PREPACH, a town of the duchy of Wurzburg; five miles S.S.E. of Geroltzhofen.

PREPARANTIA, or PRÆPARANTIA *Vasa*, in Anatomy, the spermatic vessels; being two arteries, and as many veins of the testicles; thus called by the ancients, from an opinion that the seed began to be prepared in them. See SPERMATIC Vessels, and GENERATION.

PREPARATION, PRÆPARATIO, *Apparatus*, in Mathematics, makes one of the parts or branches of a demonstration.

If it be a proposition in geometry that is to be demonstrated, the preparation consists in certain lines to be drawn in the figure: if a proposition in arithmetic, in some computation to be made to come the more easily at the demonstration.

PREPARATION, in Chemistry and Pharmacy, is applied to the several manners of managing the materia medica, and of disposing it to serve the several purposes.

There are various preparations of mercury, antimony, and other drugs, to purify them, sublimate, calcine, edulcorate them, &c.

PREPARATIONS, in Anatomy, parts of animal bodies prepared and preserved in various ways, in order to exhibit their natural or diseased structure or appearances, in short any facts illustrating their organization, economy, habits, natural changes, pathology, &c.

The knowledge of anatomy is subservient to various purposes, both of pleasure and utility. By investigating the structure of our organs, and the relations of the different parts of the mechanism, and comparing these with what we see of the living actions, we arrive at the most satisfactory knowledge that can be obtained of the latter. These subjects, and the inferences which they lead to, independently of their connection with the various branches of medical science, form as interesting a study to the philosopher as any depart-

department of nature. But the utility of these studies is placed in a much more important light, when we view their bearings on the healing art, and their tendency to illustrate every thing connected with the preservation and restoration of health, to the right understanding of which they are indispensable. An examination of bodies in various states of disease lays the foundation of pathology. It is an important object of this science to ascertain how the structure of our organs is altered by accident or disease, and what symptoms denote these alterations: we are thus enabled to determine during life, how parts which are not visible are affected, and to decide on the chances of restoration. To the surgical operator an acquaintance with the form and relative position of parts is principally useful.

Dissection of recent bodies is the chief method of learning anatomy, as it shews us the organs in the condition most nearly approaching to that of life. Individuals of both sexes and of all ages must be carefully examined, as they exhibit varieties of considerable importance in physiology and pathology. Immediately after death, animal bodies become subject to the chemical changes, which result from the affinities between them, and the surrounding elements. Hence alterations occur, which must be carefully distinguished from the natural living appearances. Our inferences from the subjects ordinarily employed for dissection must therefore be corrected by the occasional opportunities of examining the human subject, or animals while still warm. It would be useless to enter here into practical directions for the conduct of dissections, which the indispensable labours of the dissecting room will supply in a few days: still less can we go through detailed instructions for the exposure of the individual parts, for this would be only repeating what we have already said in the various anatomical articles of the Cyclopædia. We refer on these points to the works of Lieutaud, Bell, Maygrier, Marjolin, and others, enumerated at the end of the present article.

But the labours of the anatomist are not confined to the simple dissection of recent bodies. When he has prepared parts, of which the dissection is difficult and tedious, he preserves them in spirits of wine, which alters them so slightly, that they still exhibit most of the facts that are to be learned from their recent dissection. He fills the vessels with fluids of different kinds, and is thus enabled to ascertain points concerning minute structure, which would otherwise escape notice. He employs mixtures of wax, rosin, tallow, &c. to fill the blood-vessels: these being thrown in warm, become firm when cold, and thus enable him more easily to trace the various ramifications. When the parts are dissected and dried, the course of the vessels is rendered apparent. Such preparations, thoroughly dried and varnished, last for a great length of time. Parts again are often dried and preserved in oil of turpentine. Quicksilver is frequently employed as an injection, and penetrates into the minutest vessels: these preparations are usually dried, and have a beautiful appearance when preserved in oil of turpentine.

When coloured mixtures of wax and rosin are injected into the vessels or cavities of any organ, and the soft parts are destroyed by immersion in the muriatic or nitric acids, complete casts of the tubes or hollows are procured.

Immersion in diluted acids, and other chemical menstrea, long maceration in water, boiling, &c. are all occasionally employed as auxiliary modes of unravelling the texture of parts, or determining their distinguishing characters.

The use of acids is particularly important with respect to the bones: it removes their earthy particles, leaving the animal matter and vascular structure behind.

Delicate animal textures are rendered firm by rectified spirits of wine, which is the best means of accomplishing the purpose. It renders the brain perfectly hard. But it has always the inconvenience of making transparent organs opaque. Solutions of corrosive sublimate, or alum, and mixtures of acid with water, have similar effects, but these substances destroy the edge of the knife, and render the spirits, in which the part is afterwards preserved, turbid.

The bones are preserved by merely immersing them in water, until all the soft parts are rotten, and then exposing them to the sun and air to bleach. The means just enumerated are employed for the purpose of discovering and exposing the structure of the body, and for preserving parts when thus prepared.

The art is still more important in reference to morbid anatomy, because the opportunities of finding diseases are comparatively rare; and no demonstrations of morbid anatomy could be given without a collection of parts thus preserved.

For the detailed instructions concerning the manner of performing the processes just enumerated, we refer to the various publications, of which a catalogue is subjoined, and particularly to the more modern ones.

Lyser, *Culter anatomicus, hoc est methodus brevis, facilis, et perspicua artificiose et compendiose humana corpora incidendi.* Hafniæ, 1653, 8vo.

Bartholin, *Administrationum anatomicarum specimen;* subjoined to the third edition of the work of Lyser, Frankfurt, 1679, 8vo.

Tassin, *Administrations anatomiques,* Paris, 1673; 12mo.

Albinus, *Oratio, quæ ad veram viam, ad fabricæ corporis humani cognitionem ducit.* Leid. 1721, 4to.

Cassebohm, *Methodus secandi musculos, et methodus secandi viscera.* Halle, 1740, 8vo.

Lieutaud, *Essais anatomiques,* 8vo.

Sue, *Anthropotomie, ou l'art d'injecter, de dissequer, d'embaumer, et conserver les parties du corps humain.* Paris, 1765, 12mo.

Pole, *Anatomical Instructor; or an illustration of the modern and most approved methods of preparing and preserving the different parts of the human body, and of quadrupeds, by injection, corrosion, maceration, distention, articulation, modelling, &c.* London, 1790, 8vo.

Dumeril, *Essai sur les moyens de perfectionner et d'étudier l'art de l'anatomiste.* Paris, 1803, 8vo.

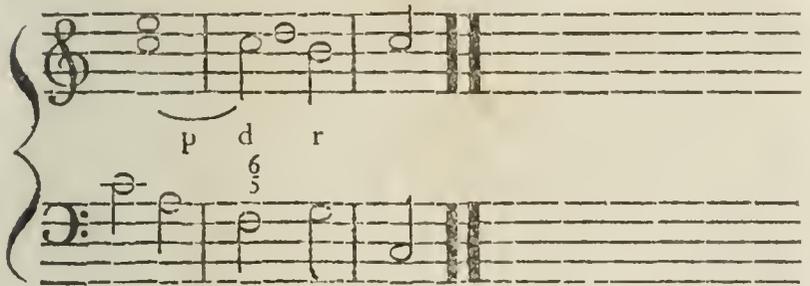
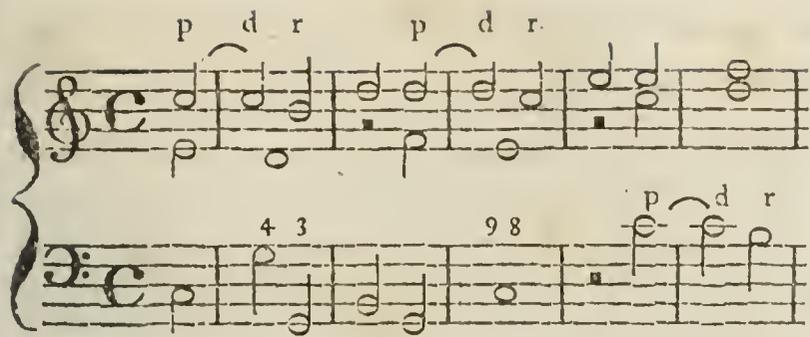
Maygrier, *Manuel de l'anatomiste, ou traité methodique et raisonné sur la manière de préparer toute les parties de l'anatomie.* Paris, 1811, 8vo.

Marjolin, *Manuel d'anatomie, contenant l'exposition des méthodes les plus avantageuses à suivre pour dissequer, injecter, conserver les parties qui composent le corps de l'homme, et pour proceder à l'ouverture et à l'examen des cadavres; ouvrage spécialement destiné à servir de guide aux élèves, qui desirerent faire un étude approfondie de l'anatomie; vol. i.* Paris, 1812, 8vo.

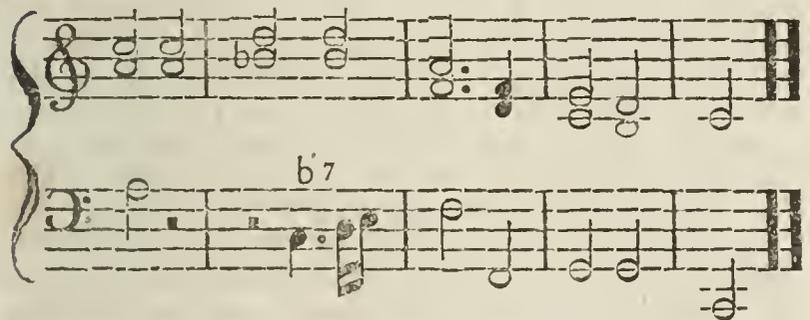
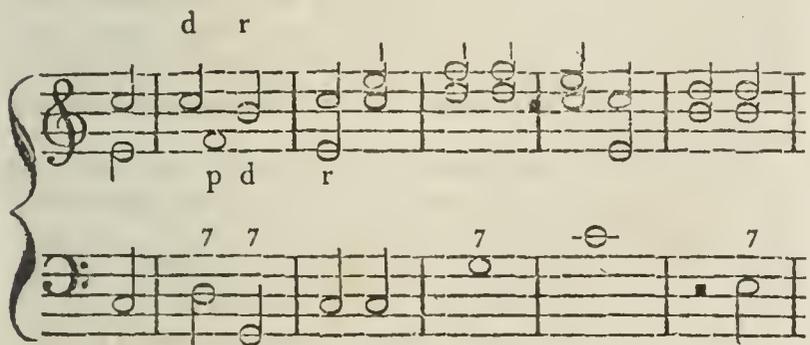
C. Bell's *System of Dissections; explaining the anatomy of the human body, the manner of displaying the parts, and their varieties in disease,* Folio, with plates.

C. Bell's *System of Dissections, &c. &c.;* pointing out to the student the objects most worthy his attention during a course of dissections. 2 vols. 12mo.

PREPARATION of Discords, in Music. Rousseau has made a long article of this term unnecessarily: *to prepare a discord,* is its being a concord to the preceding note or found; and *resolving a discord,* is its being succeeded by a concord. But an example in notes will be the best explanation of these rules. See COUNTERPOINT, COMPOSITION, and explanatory plates.



The above are all the original, prepared, and fundamental discords, except the 7th, which need not always be prepared.



The regular prepared discords are the 2, 4, 7, 9. The rest, as the 4*, 5b, extreme 6*, and extreme b7th, may be used *per saltum*, or by leaps.

PREPARATORY TORTURE. See TORTURE.

PREPARIO, in *Geography*, a small island in the East Indian sea, consisting of a ridge of land, covered with wood; and having a pond of fine fresh water above is very convenient for watering. No animals are visible upon it except rats, squirrels, and monkies. Two ledges of rocks project into the sea at the watering point, and between them is a fine sandy beach, where boats may land very easily with casks to water. N. lat. 14° 50'. E. long. 93° 45'.

PREPENSED, PRÆPENSUS, in *Law*, denotes *forethought*. In which sense we say prepenfed malice, &c.

If, when a man is slain upon a sudden quarrel, there were malice prepenfed formerly between them, it makes it murder; and as it is called in some statutes, prepenfed murther.

PREPIA, in *Geography*, a town of Asiatic Turkey, in Natolia; eight miles S. of Mogla.

PREPOSITION, PRÆPOSITIO, in *Grammar*, one of the parts of speech or discourse.

The preposition is an indeclinable particle, which yet serves to govern the nouns that follow it. Such are, *per, pro, propter, in, with, through, from, by, &c.*

They are called prepositions, because *præposita*, placed before the nouns they govern.

F. Buffier does not allow the preposition to be a part of speech, but merely a modificative of a part of speech; *viz.* of the nouns; serving only to modify or circumstantiate it. See MODIFICATIVE.

The ingenious Mr. Harris ranges the preposition under the class of connectives, and defines it a part of speech devoid itself of signification, but so formed as to unite two words that are significant, and that refuse to unite or coalesce of themselves. Those connectives which join sentences, are called conjunctions. Hermes, book ii. chap. 3.

One great use (says bishop Lowth, Int. to Eng. Gram. p. 114.) of prepositions in English, is to express those relations, which in some languages are chiefly marked by cases, or the different endings of the noun.

Prepositions are also prefixed to words in such manner as to coalesce with them, and to become a part of them. There are also certain particles, which are thus employed in composition of words, yet cannot stand by themselves in construction; which are called inseparable prepositions; as *a, be, con, &c.*

PREPOSITUS VILLÆ is sometimes used for the chief officer of the king, in a town, manor, or village.

In ancient records, the præpositus villæ was no more than the bailiff of the lord of the manor.

Præpositus villæ is sometimes also used, in later writers, for the constable of a town, or petty constable.

PREPOSITUS Ecclesiæ. See CHURCH-REVE.

Quatuor homines Præpositi, in Crompton, &c. denote four men of each town, who are to appear before the justices of the forest in their circuit.

PREPUCE, or PREPUTIUM, in *Anatomy*, the foreskin, is the loose doubling of integuments covering the glans of the penis and of the clitoris. See GENERATION.

PREPUCE, Diseases of, in *Surgery*. See PHIMOSIS, PARAPHIMOSIS, &c.

PRERAU, or PRZEROW, in *Geography*, one of the most ancient towns of Moravia, and capital of a circle to which it gives name, containing about 300 houses; 13 miles S.E. of Olmutz. N. lat. 42° 26'. E. long. 17° 25'.

PREROGATIVE, PRÆROGATIVA, a privilege, or pre-eminence, which one person has over another.

The word is borrowed from the appellation of a century in ancient Rome, which gave the first vote, or suffrage, in the comitia, or assemblies for the election of magistrates; quasi prærogati; because first asked, or their suffrage first required.

Their vote was called *omen prærogativum*, because the rest usually gave their votes the same way.

PREROGATIVE of the King, *Prærogativa Regis*, is that power, pre-eminence, and privilege, which the king hath over and above all other persons, and out of the ordinary course of the common law, in right of his regal dignity. The king's prerogatives are either *direct* or *incidental*: the *direct* are such positive substantial parts of the royal character and authority, as are rooted in any spring from the king's political person, considered merely by itself, without reference to any other extrinsic circumstance; as the right of sending ambassadors, of creating peers, and of making war or peace. But such prerogatives as are *incidental*, bear always

a relation to something else, distinct from the king's person, and are indeed only exceptions, in favour of the crown, to those general rules that are established for the rest of the community; such as, that no costs shall be recovered against the king, that the king can never be a joint-tenant, and that his debt shall be preferred before a debt to any of his subjects, &c. &c. The substantive direct prerogatives are of three kinds; being such as regard, first, the king's royal character; secondly, his royal authority; and, lastly, his royal income. See KING and REVENUE.

It is one of the principal bulwarks of civil liberty, or of the British constitution, that the king's prerogative is limited by bounds so certain and notorious, that it is impossible he should ever exceed them, without the consent of the people, on the one hand; or without, on the other, a violation of that original contract, which in all states implicitly, and in our's most expressly, subsists between the prince and the subject. And it is one of the most manifest proofs of that genuine freedom, which is the boast of this age and country, that the limits of the king's prerogative may be examined and discussed with decency and respect, without offence and danger. This was formerly reckoned among the arcana imperii: and queen Elizabeth directed her parliaments to abstain from discoursing of matters of state; and maintained, both in person and by her ministers, that this august assembly ought not to deal, to judge, or to meddle with her majesty's prerogative royal. And king James I. more than once laid it down in his speeches, that as it is atheism and blasphemy in a creature to dispute what the Deity may do, so it is presumption and sedition in a subject to dispute what a king may do in the height of his power. Good Christians, he adds, will be content with God's will revealed in his word; and good subjects will rest in the king's will, revealed in his law. King James's Works, 557. 531.

PREROGATIVE, *Contempts against the King's*. See CONTEMPT.

PREROGATIVE *Copyrights*, are acts of parliament, proclamations, and orders of council, liturgies, and books of divine service, and grammars, and other compositions, compiled or translated at the expence of the crown, translation of the bible, &c.

PREROGATIVE *Court*. See COURT of Prerogative.

PREROGATIVE, *Felonies and Misdemeanors against the King's*, are those that relate to the coin, not amounting to treason, against the king's council (see PRIVY-council), and those incurred by foreign service, by imbezzling the king's armour or warlike stores (see IMBEZZLE), and by desertion from the king's army or navy, which, by the standing laws of the land, and particularly by 18 Hen. VI. cap. 19, and 5 Eliz. cap. 5, is made felony, but not without benefit of clergy. But by 2 & 3 Edw. VI. cap. 2, clergy is taken away from such deserters, and the offence is made triable by the justices of every shire. The same statutes punish other inferior military offences with fines, imprisonments, and other penalties. See DESERTER, and MUTINY.

PREROGATIVE, *Property by*. See PROPERTY.

PRESA, in the *Italian Music*, is in general a character which shews when and where a performer in concert is to begin to sing or play; but, in particular, in fugues or canons it is thus marked \ddagger over the note at which the second part, which is to follow or imitate the first, must begin. If the mark be repeated a second time, it is to shew the place where the third part must begin, to imitate the second; and so on through all the parts.

It is in fugues and canons a signal for the several parts to begin, after the subject is led off. At present, in catches,

and *canoni chiusi* written in one line, this is done by numbers, or by this *segno*, \S .

PRESAGE, PRÆSAGIUM, an augury, or sign of something to come.

The Romans judged of future events by certain signs, which their superstition, or the artifice of their priests, had invented. Their most celebrated presages were founded on the flight of birds, or the entrails of victims. All night-birds passed for birds of ill presage.

M. Simon, (t. 1. Acad. Belles Lettres, p. 54.) reduces presages to seven kinds; viz. casual words, which were divine voices, when their author was unknown, and human voices when it was known who pronounced them; the startings of some parts of the body, chiefly of the eyes, the eyebrows, and the heart; the tingling of the ear, and those imaginary sounds, which were sometimes heard; sneezings in the morning, which were not good omens (see OMENS), whilst those in the afternoon were favourable; the accidental rencounter of certain persons and certain animals, which presaged either good or evil; and names of good or bad portent; so that those who regarded presages were very scrupulous in observing, that the first soldiers they enlisted, the children who served at the sacrifices, those who performed the dedication of a temple, should have lucky names, and they had an aversion to those which imported any thing sad or disastrous. See PRODIGY. See also AUGURS, AUSPICES, and ARUSPICES.

PRESBURG, or POSEN, in *Geography*, a free and royal town of Hungary, and capital of the kingdom; pleasantly and salubriously situated on the N. side of the Danube, at the foot of a mountain on which is a castle. In the cathedral, from the time of king Ferdinand I., the kings of Hungary have been crowned. From the year 1723 the diets have been held here, the first having been assembled by king Sigismund in 1411. This has also been the residence of the council of the king's lieutenant, of the treasury-office for Hungary, of the archbishop of Gran, and likewise a chapter of 14 regular canons, a college with a gymnasium and church, besides three other convents and churches, a Protestant school, and a Lutheran church. The city is badly built: the houses, properly so called, do not exceed 200, and its fortifications consist merely of a double wall and moat. The suburbs are spacious and handsome, and contain four convents with churches, and two hospitals. The peace of Presburg, as it has been called, between France and Austria, was signed here on the 26th of December, 1805; 23 miles E.S.E. of Vienna. N. lat. 48° 10'. E. long. 17° 15'.

PRESBYS, in *Ornithology*, a name used by many of the ancient naturalists for the *regulus cristatus*, or golden crowned wren. See MOTACILLA *Regulus*.

PRESBYTA, Πρεσβυτης, in *Optics*, a term applied to persons in whom the configuration of the crystalline of the eye is too flat, so that they see distant things clearly; but those near at hand confusedly.

The reason is, that, in near objects, the visual rays passing the retina before they unite, there can be no distinctness, since the distinct base falls too far off beyond the retina.

This defect is helped only with convex glasses or spectacles; which will make the rays converge sooner, and, if they are well fitted, fall exactly on the retina.

The word is formed from the Greek, πρεσβυτης, *senex*, because old people are naturally subject to this defect: time, and

and the friction of the eye-lids, &c. gradually wearing the ball flat.

Presbytæ are opposed to myopes, in whom the crystalline is too round.

If the distance between the retina and the crystalline be too small, the person will likewise be a presbyta. See EYE and VISION.

PRESBYTÆ, or PRESBYTIA, from *πρεσβυς*, *old*, defective sight from flatness of the cornea; an infirmity, to which old persons are particularly subject.

PRESBYTER, a priest, or person in priest's orders.

He is thus called from the Greek, *πρεσβυτερος*, *elder*, of *πρεσβυς*, *old*, because, anciently, none were ordained but such as were advanced in years.

The great dispute between the retainers to the Geneva and the Roman discipline is, about the sameness or difference of presbyters and bishops in the times of the apostles.

Those who consult Acts, xx. 17. 28. Phil. i. 1. Tit. i. 5. 7. and 1 Tim. iii. 1. may perhaps be led to conclude, that these titles were applied to the same persons.

The learned bishop Usher expressly says, "I have ever declared my opinion to be, that *episcopus* & *presbyter gradu tantum differunt, non ordine*; and consequently, that in places where bishops cannot be had, the ordination by presbyters stands valid." And being asked by his majesty at the Isle of Wight, "Whether he found in antiquity, that presbyters alone ordained any?" he replied, "Yes; and that he could shew his majesty more; even where presbyters alone successively ordained bishops;" and instanced in Jerom's words (Epist. ad Evagrium) of the presbyters of Alexandria chusing and making their own bishops from the days of Mark, till Heraclius and Dionysius. Baxter's Life, p. 206.

This was the constant sense of our first reformers, Cranmer, Pilkington, Jewel, Grindal, Whitgift, Bancroft, &c. Bishop Burnet expressly says: "As for the notion of distinct offices of bishop and presbyter, I confess it is not so clear to me; and therefore, since I look upon the sacramental actions as the highest of sacred performances, I cannot but acknowledge those who are empowered for them must be of the highest office in the church." Vind. of the Church of Scotland, p. 336. See BISHOP.

PRESBYTERIANS, a denomination comprehending a very considerable number of persons in Great Britain; but very differently applied in England and Scotland. The English presbyterians do not materially differ from the independents with regard to church-government and discipline, and mode of worship; but they generally allow a greater latitude of religious sentiments and communion in their churches. The appellation, in this restricted use of it, implies no attachment to the authority of synods, presbyteries, or ecclesiastical assemblies composed of deputies from different churches, any more than to episcopacy and the ecclesiastical hierarchy; and, therefore, according to its original use, it is improperly applied to many who are now distinguished by it, and who form a very respectable class of non-conformists, or protestant dissenters in this kingdom. See INDEPENDENTS.

But the presbyterians, properly so called, and with whom the former agree in some particulars, admit, in general, and allowing for that latitude of sentiment, which will ever be the result of unrestrained and liberal enquiry, the doctrinal articles of the church of England; their chief difference lies in the point of discipline, *viz.* who shall appoint the governors of the church, and what subordination there shall, or shall not, be between them.

The presbyterians allow of no hierarchy, no subordination in the persons of their ministers; bishops and priests they maintain, in the times of the apostles, were the same; and therefore, though they allow episcopacy, as now settled in the church of England, to be very ancient, yet they deny it to be *jure divino*.

In lieu of a series of ministers one over another, in quality of priests, bishops, and archbishops, their polity consists in a series of assemblies or synods. Thus every minister is to be obedient to the classis under which he lives; and that class to a synod, provincial, classical, or œcumenical.

The power of ordination, with them, resides in a classis; and none are admitted to administer the sacrament, but those ordained by the imposition of hands of other ministers.

They make use of deacons to take care of their poor; and, in the government of the church they call in lay-elders; whence their name: from the Greek *πρεσβυτερος*, signifying *senior, elder*. See PRESBYTERY.

This is now the established discipline of the church of Scotland, where it was introduced as soon as it began to assume a regular form, about the year 1560. Calvin, whose decisions were received among the protestants of that age with incredible submission, was the patron and restorer of this scheme of ecclesiastical policy. The church of Geneva, formed under his eye, and by his direction, was esteemed the most perfect model of government; and Knox, who, during his residence in that city, had studied and admired it, warmly recommended it to the imitation of his countrymen. But on the first introduction of this system, he did not think it expedient to depart altogether from the ancient form; instead of bishops he proposed to establish ten or twelve superintendants in different parts of the kingdom, who were empowered to inspect the life and doctrine of the other clergy, to preside in the inferior judicatories of the church, and to perform several other parts of the episcopal function; their jurisdiction, however, extended to sacred things only; they claimed no seat in parliament, and pretended no right to the dignity or revenues of the former bishops. The number of the inferior clergy was, at this time, very small; and in a few places only were formed into regular classes or societies. In order to give greater strength and consistence to the presbyterian plan, Knox, with the assistance of his brethren, composed, in 1561, the first book of discipline, which contains the model or platform of the intended policy. However, though the general assembly in the year 1566 had approved of the Geneva discipline, the parliament did not confirm the votes of the assembly, nor formally deprive the bishops of their power; but all church affairs from that time were managed by presbyteries, and general assemblies. In the year 1574 they voted the bishops to be only pastors of one parish; in 1577 they ordained that all bishops should be called by their own names; and in the next year they voted the name of a bishop to be a grievance. In 1580 the general assembly, with one voice, declared diocesan episcopacy to be unscriptural and unlawful. In the same year king James, with his family, and the whole nation, subscribed a confession of faith, with a solemn league and covenant annexed, obliging themselves to maintain and defend the protestant doctrine and presbyterian government. In the year 1584 the bishops were restored by parliament to some parts of their ancient dignity. In 1587 the king consented to an act to take away bishops' lands, and annex them to the crown; and in 1590 it was ordained, that all who bore office in the kirk, or should hereafter do so, should subscribe to the book of discipline. In 1592, all acts of parliament in favour of popery and episcopacy were annulled; and an

act passed for establishing the presbyterian government, its general assemblies, provincial synods, presbyteries, and kirk sessions, with all the different branches of their discipline and jurisdiction, in the most ample manner. This act was again confirmed in 1593 and 1594. King James, during the latter years of his administration in Scotland, revived the name and office of bishops; but they possessed no ecclesiastical jurisdiction or pre-eminence; their revenues were inconsiderable, and they were scarcely distinguished by any thing but by their seat in parliament, and by being the object of the clergy's jealousy, and the people's hatred. The king, delighted with the splendour and authority which the English bishops enjoyed, and eager to effect an union in ecclesiastical policy, resolved to bring both churches to an exact conformity with each other. Three Scotsmen were consecrated bishops at London, from whom their brethren were commanded to receive orders. Ceremonies unknown in Scotland were imposed; and though the clergy, less obsequious than the nobles, boldly opposed these innovations, James, long practised and well skilled in the arts of managing them, obtained at length their compliance. But Charles I. a superstitious prince, unacquainted with the genius of the Scots, imprudent and precipitate in all the measures he pursued in that kingdom, pressing too eagerly the reception of the English liturgy, and indiscreetly attempting a resumption of church-lands, kindled the flames of civil war; and the people being left at liberty to indulge their own wishes, the episcopal church was overturned, and the presbyterian government and discipline were re-established with new vigour. Together with monarchy, episcopacy was restored in Scotland. The aversion of the nation, however, was insurmountable, and it subsisted with difficulty. At the Revolution, the inclinations of the people were thought worthy the attention of the legislature, the presbyterian government was again established (see CONVENTION), and being ratified by the UNION, is still maintained in that kingdom.

The abuse of church power in the beginning of the reign of James I. obliged many learned ministers and their followers to leave the kingdom, and retire to Amsterdam, Rotterdam, the Hague, Leyden, Utrecht, and other places of the Low Countries, where English churches were erected after the presbyterian model, and maintained by the states according to treaty with queen Elizabeth, as the French and Dutch churches were in England.

The first presbyterian church in England was established at Wandsworth, near London, in 1572; and others were afterwards erected in neighbouring counties. After the commencement of the troubles in the reign of Charles I. propositions for establishing presbyterian government in England were made in the treaty of Uxbridge, A.D. 1645; and so zealous were the advocates for it, that many of them maintained the divine right of it. This opinion of its origin was carried in the assembly of divines, but negatived in the house of commons. This form of church government was established, by way of probation, in 1646; though not without considerable opposition and clamour. In the year 1648, an ordinance for more effectually settling the presbyterian government, without limitation of time, received the sanction of both houses, under the title of a form of church government, to be used in the churches of England and Ireland. Under the commonwealth, in 1649, the Presbyterian government was declared by the house to be the established government; it continued, though at a low ebb, under the protectorate of Oliver Cromwell, who was more favourably inclined to the independents, and to the Restoration of Charles II., an event in which the presbyterians and army, under the direction of general Monk, concurred.

At this period episcopacy was re-established; the imprudent zeal of the presbyterians was forgotten, and they suffered in common with others who disapproved the hierarchy, and who scrupled conformity to the established articles of doctrine and discipline, till they were in some measure relieved by the act of Toleration, which has been modified, with considerable improvements, favourable to religious liberty, during the present reign. See TOLERATION of *Dissenters*.

PRESBYTERY, PRESBYTERIUM, πρεσβυτεριον, an assembly of the order of presbyters, or priests, with lay-elders, for the exercise of church-discipline.

The kirk, or church, of Scotland, is divided into sixty-nine presbyteries, each consisting of a number of parishes, not exceeding twenty-four, nor less than twelve.

The ministers of these parishes, with one ruling elder, chosen half-yearly, out of every kirk-session, constitute a presbytery; who, meeting in their chief town, whence the presbytery is denominated, choose a moderator, or, more properly, a prolocutor, who must be a minister, half-yearly.

They determine all appeals from kirk-sessions, *i. e.* from the several parochial assemblies; but can try nothing at the first instance cognizable before a kirk-session.

They compose all differences between ministers and people; for which end, they hold presbyterial visitations in each parish, where they examine the registers of the kirk-sessions, &c.

They enquire into repairs of churches; see that the glebe, &c. suffer no dilapidations; appoint schools in the parishes; and see that the funds be not misapplied.

They alone can exclude from the communion; license probationers; suspend, depose, and, in effect, determine all ecclesiastical matters within their district. From the presbytery there lies an appeal, in all cases, to provincial synods.

PRESBYTERY, *Presbyterium*, is sometimes also used for the choir of a church, because anciently appropriated to the presbyters. In opposition to the nave or body of the church, which was for the people.

PRESCHIEF, in *Geography*, a town of Persia, in Faristan; 18 miles S. of Schiras.

PRESCIANO, a town of Naples, in Principato Citra; 20 miles E.S.E. of Salerno.

PRESCIENCE, in *Theology*, *prevision*, or *fore-knowledge*; that knowledge which God has of things to come.

The doctrine of predestination, as some divines understand it, is founded on the prescience of God, and on the supposition of all futurity's being present to him.

Human reason can scarcely reconcile the prescience of God with the free-agency of man; hence some have been led to deny the divine prescience, and others to maintain the doctrine of necessity. See LIBERTY and NECESSITY.

PRESCOT, in *Geography*, a market-town and parish in the hundred of West-Derby, and county palatine of Lancaster, England. The town is situated on the great road from London to Liverpool, by Warrington, at the distance of 198 miles N.W. from the metropolis; and six miles E. from Liverpool. It consists principally of one long, straggling street, seated upon high ground, in the midst of numerous collieries, some of which extend under the town itself. The church is a large and spacious structure, with a lofty steeple, which constitutes a prominent object of view from all the low parts of this county, and of Cheshire, for an extent of many miles. Here is besides, a meeting-house, appropriated to the worship of dissenters; also a free-school, and several alms-houses. The market day is Tuesday, weekly; and there are three fairs during the year. The principal manufacture carried on here is the making of watch-tools, for

which

which the town has been celebrated for upwards of a century. The drawing of pinion wire originated at Prescot, and is carried as far as to fifty drawings. (See WIRE.) Here are made small files, considered to be the best in the world, and also various component parts of watches.

According to the parliamentary returns of 1811, Prescot town contained 770 houses, and a population of 3675 persons; and the remainder of the parish, including the townships of Bold, Cronton, Cuerdley, Ditton, Eccleston, Parr, Penketh, Rainford, Ramhill, Great-Sanke, Sutton, Whifton, Widness, Appleton, and Windle, 2867 houses, and 16,060 inhabitants. At Ravenhead, close to St. Helens, which Dr. Aikin, in his "Description of the country round Manchester," says, "has of late years risen from a small village to be a well-built and populous market-town," is an extensive manufactory of plate glass. This was first established in 1773, under the authority of an act of parliament, incorporating the proprietors; but that concern having failed in 1794, a new company was incorporated the same year, which has been hitherto eminently successful. Cast plate glass, also concave and convex mirrors, are now made here, of sizes and qualities equal, or superior, to any imported from the continent. Of the former, some have been made to measure 139 inches by 69; and of the latter many are manufactured 36 inches in diameter. In these extensive works, which cover nearly thirty acres of ground, and are inclosed by a wall, upwards of 300 persons are constantly employed in the various processes of melting, casting, blowing, polishing, &c. The room, or hall, in which the glasses are cast, is 200 feet long, by 78 broad; and has its roof entirely supported by pointed arches resting upon the side walls as abutments. Near this manufactory is one for smelting and refining copper ore, brought from Paris mountain in Anglesey; and within the township of St. Helens is another for similar purposes.

Within the township of Sutton, in this vicinity, is found an excellent clay, made use of for making sugar moulds, and coarse earthen-ware; and within the township of Rainford, about five miles to the north, is a good clay for making crucibles and fine bricks. Coal is abundant throughout the whole extent of this parish, and frequently lies under beds of iron-stone, which appear at one time to have been wrought, as on some particular spots, beds of coke, or cinders, are discovered several feet deep. The tradition of the country is, that they indicate the scites of iron-works established by the Danes during their occupation of this district.

The chief seat in the neighbourhood of Prescot is Knowsley-park, the property and principal residence of the earl of Derby. The house stands upon elevated ground, and consists of two divisions, one constructed of stone and the other of brick. The stone division, which has two round towers attached to it, is said to have been built by Thomas, the first earl of Derby, about the year 1480, but there can be little doubt of the greater antiquity of part of it; and indeed, in the history of the house of Stanley, the nobleman above-mentioned is spoken of only as having repaired and beautified the mansion for the reception of his son-in-law king Henry VII. The brick division is of modern date. In this house are various family portraits, and some pictures by the most celebrated among the Flemish and Italian masters. The park is extensive, and abounds with fine plantations of young and old trees. See Beauties of England and Wales, vol. ix. by John Britton, F.S.A.; also a Description of the Country from 30 to 40 miles round Manchester, by I. Aikin, M.D., 4to. 1795.

PRESCRIPTION, PRÆSCRIPTIO, in Law, a right or title acquired by use and time.

Prescription is a sort of title introduced for assuring the property of effects in favour of persons who have possessed them a certain time; and to keep off any who would disquiet them, or recover the thing possessed, after the term fixed by the laws.

Tourelle calls prescription a penalty imposed, by the laws, upon negligence; and adds, that possessors, who have no other title to plead but prescription, are only legal usurpers.

In effect, however, the law of prescription does not punish the indolence of proprietors, but only interprets their silence for their consent; presuming, that a man who neglects to assert his right for a long series of years, gives it up.

There are some of the lawyers who doubt, whether time and unjust prescription be any legitimate means of acquiring. Others, more favourable, call it the *patroness of mankind*; as being a general presumption, under which the law will have men live in peace.

In the common law, prescription is usually understood of a possession from time immemorial, or beyond the memory of man; as, when my ancestors, or his from whom I have an estate, have enjoyed and used it all the time whereof any memory remains.

But in the civil law, and even in our common law, there are prescriptions of a much shorter date; prescription of forty years excludes all actions whatever. Reform. Leg. Eccles.

The distinction between *custom* (which see) and *prescription* is this: that custom is properly a local usage, and not annexed to any person; such as, a custom in the manor of Dale that lands shall descend to the youngest son: prescription is merely a personal usage; as that Sempronius and his ancestors, or those whose estate he hath, have used time out of mind to have such an advantage or privilege. (Co. Litt. 113.) All prescription must be either in a man and his ancestors, or in a man, and those whose estate he hath, which last is called prescribing in a *que estate*. And formerly a man might, by the common law, have prescribed for a right which had been enjoyed by his ancestors or predecessors at any distance of time, though his or their enjoyment of it had been suspended for an indefinite series of years. But by the statute of limitations, 32 Hen. VIII. c. 2, it is enacted, that no person shall make any prescription by the seisin or possession of his ancestor or predecessor, unless such seisin or possession hath been within three-score years next before such prescription be made. This title of prescription was well known in the Roman law by the name of *usucaptio*; so called, because a man, that gains a title by prescription, may be said *usu rem capere*.

As to the several species of things which may, or may not, be prescribed for, it may be observed, 1. That nothing but incorporeal hereditaments can be claimed by prescription; as a right of way, a common, &c. but that no prescription can give a title to lands, and other corporeal substances, of which more certain evidence may be had. 2. A prescription must always be laid in him that is tenant of the fee. A tenant for life, for years, at will, or a copy-holder, cannot prescribe, by reason of the imbecility of their estates. (4 Rep. 31, 32.) For, as prescription is usage beyond time of memory, it is absurd that they should pretend to prescribe, whose estates commenced within the remembrance of man. 3. A prescription cannot be for a thing which cannot be raised by grant. 4. What is to arise by matter of record cannot be prescribed for, but must be claimed by grant, entered on record; such as the royal franchises of deodands, felon's goods, &c. But the franchises of treasure-trove, waifs, estrays, and the like, may be claimed by prescription;

prescription; for they arise from private contingencies, and not from any matter of record. (Co. Litt. 114.)

5. Among things incorporeal, which may be claimed by prescription, a distinction must be made with regard to the manner of prescribing; that is, whether a man shall prescribe in a *que estate*, or in himself and his ancestors. For if a man prescribes in a *que estate* (that is, in himself, and those whose estate he holds) nothing is claimable by this prescription, but such things as are incident, appendant, or appurtenant to lands; but if he prescribes in himself and his ancestors, he may prescribe for any thing whatever that lies in grant; not only things that are appurtenant, but also such as may be in gross. (Litt. § 183. Finch, l. 104.) 6. Estates gained by prescription are not of course descendible to the heirs general, like other purchased estates, but are an exception to the rule. Blackst. Comm. book ii. ch. 17.

The custom of Paris allows of a prescription of ten years, if the parties be present; and of twenty, if absent; in favour of peaceable possessors of an inheritance, if they have any title, however controverted; and of thirty years, in favour of those who possess without any title at all.

In Normandy, a prescription of forty years peaceable possession is equivalent to a title to immoveables; and for moveables, and personal actions, a prescription of thirty years suffices.

In Romish countries, prescription does not avail against the church, if short of a hundred years. In France, prescription of twenty years is admitted against all crimes, except duelling, which was excluded by a declaration of the year 1679. In matters of adultery, five years suffice; *i. e.* provided there have been a discontinuance of prosecution all that time.

By our statutes, a judge or clerk convicted of false entering pleas, &c. may be fined within two years; but those elapsed, he prescribes against the punishment of the statute.

The crime of maintenance or embracery, whereby perjury is committed by a jury, must be prosecuted within six days; or otherwise the parties prescribe.

There is no prescribing against a man's lord; no prescription avails to take off any servitude or tenure; a title is always required there.

The author of the History of the Inquisition observes, that no time of prescription avails in matters of heresy; even death itself does not secure the suspected from the researches of that tremendous court.

PRESCRIPTION, in the *Law of Nations*. See USUCAPTION.

PRESCRIPTION, *Corporations by*, are those which have existed as corporations, time whereof the memory of man runneth not to the contrary; with regard to which the king's consent is presumed. For though the members thereof can shew no legal charter of incorporation, yet in cases of such high antiquity, the law presumes there once was one; and that by the variety of accidents, which a length of time may produce, the charter is lost or destroyed.

PRESCRIPTION, *Modus by*. See MODUS DECIMANDI.

PRESCRIPTION *de non decimando* is a claim to be entirely discharged of tithes, and to pay no compensation in lieu of them. Thus the king is discharged by his prerogative from all tithes. (Cro. Eliz. 511.) So a vicar shall pay no tithes to the rector, nor the rector to the vicar, for "ecclesia decimas non solvit ecclesiæ." (Cro. Eliz. 479. 511. Lev. 3. Moor 910.) But these personal privileges (not arising from or being annexed to the land) are personally confined both to the king and the clergy; for their tenant or lessee shall pay tithes, though in their own occupation their lands are not generally tithable. (Ibid. 479.) And

generally speaking, it is an established rule, that, in *lay* hands "modus de non decimando non valet." (Ibid. 511.) But spiritual persons or corporations, as monasteries, abbots, bishops, and the like, were always capable of having their lands totally discharged of tithes, by various ways, (Hob. 309. Cro. Jac. 308.) as, 1. By real composition: 2. By the pope's bull of exemption: 3. By unity of possession; as when the rectory of a parish, and lands in the same parish, both belonged to a religious house, those lands were discharged of tithes by this unity of possession: 4. By prescription; having never been liable to tithes, by being always in spiritual hands: 5. By virtue of their order; as the Knights Templars, Cistercians, and others, whose lands were privileged by the pope with a discharge of tithes. (2 Rep. 44. Seld. tith. c. 13. § 2.) Though upon the dissolution of abbeys by Henry VIII., most of these exemptions from tithes would have fallen with them, and the lands become tithable again, had they not been supported and upheld by the statute 31 Hen. VIII. c. 13. which enacts, that all persons who should come to the possession of the lands of any abbey then dissolved, should hold them free and discharged of tithes, in as large and ample a manner as the abbeys themselves formerly held them. And from this original have sprung all the lands, which, being in lay hands, do at present claim to be tithe-free; for, if a man can shew his lands to have been such abbey lands, and also immemorially discharged of tithes by any of the means before-mentioned, this is now a good prescription *de non decimando*. But he must shew both these requisites: for abbey lands, without a special ground of discharge, are not discharged of course; neither will any prescription *de non decimando* avail in total discharge of tithes, unless it relates to such abbey lands. Blackst. Comm. b. ii. See TITHES.

PRESCRIPTION, in *Medicine*, the act or art of directing proper remedies for diseases. The word is also applied to the written *formula*, by which the individual substances are directed to be combined or administered.

The art of prescription is of course the result of a knowledge of the nature of the living body, both in a state of health and disease; and of an accurate examination of the symptoms of the disease present, together with an acquaintance with the various articles of the materia medica, and with their operation and properties, chemical and vital. The best prescription is that which directs the most active and appropriate medicines, in the simplest manner, and most natural combination. It was formerly the practice of physicians, to unite in one formula the great farrago of drugs, many of them, indeed, very inert in their agency, but many which differed materially in their properties; a practice, by which the operation of the whole was rendered extremely obscure, and the means of discriminating the powers of medicines in a great measure prevented. Simplicity certainly constitutes the chief elegance of prescription, and if at the same time correctness of combination, and a just application of the most active ingredient, be observed, the full end is obtained. The correctness of combination, however, especially where chemical agencies are introduced, depends upon a knowledge of the affinities which exist between different substances; from the want of which knowledge, it not unfrequently happens, that the substances intended to be administered are neutralised, decomposed, or united in new combinations, and a very different medicine is actually given. *Extemporaneous* prescription, in particular, requires an accurate knowledge of these points. Another object, though commonly of secondary importance, requires to be attended to, namely, to render the medicine as agreeable to the palate, as is consistent with its qualities. This is of importance, at

least in the medicines directed for children, and for those who possess, either naturally, or in consequence of the disease, a great delicacy of stomach, and at all times when a long course of medicine is absolutely necessary, in order to ensure that it shall be taken. It is scarcely necessary to add, that an accurate knowledge of the doses of all the medicines prescribed, is absolutely requisite for salutary, or even safe prescription.

PRESCRIPTION, in *Theology*, was a kind of argument pleaded by Tertullian, in the third century, against erroneous doctors; and which has been urged by Catholics (see **METHODISTS**), and others, in more modern times. With regard to this mode of arguing, we may observe, that there is scarcely any case, in which the plea of prescription can be admitted as a satisfactory argument in favour of religious tenets, or articles of faith; unless by prescription be meant, a doctrine's being established in the time and by the authority of the apostles. In all other cases, prescription is no argument at all; it cannot recommend error, and truth hath no need of its support.

PRESENCE, **PRÆSENTIA**, a term of relation, used in opposition to *absence*, and signifying the existence of a person in a certain place; or the state of a person considered as co-existing with another.

In this sense, an obligation is said to be passed in presence of a notary and witnesses; at the breaking open a seal of a minor, or an absent person, the presence of a substitute is necessary.

The schoolmen hold, that presence, in speaking of bodies, denotes not only a co-existence, but a sort of contact.

They distinguish two kinds of presence; the one *virtual*, in which sense a spirit, or mind, is said to be present to a body when it acts upon it; the other *corporeal*, which consists in a physical contact.

The treasurers, &c. of France have what they call a *right of presence*; a certain sum due on their actual attendance in their offices, to oblige them to be the more assiduous in their function.

A person absent in the service of the king, or a community, is represented as present.

The Roman Catholics believe the real presence of Jesus Christ in the eucharist, both in body and soul. See **TRANSUBSTANTIATION**.

PRESENT, **PRÆSENS**, in *Grammar*, the first tense, or inflexion of verbs; expressing the time present, or that which now is.

It is a particular piece of address in eloquence, to make use of the present for a past tense, in order to express a past action with the more force and warmth. Thus, the fleet is no sooner in full sea, than the heavens begin to lower, the winds rise, the waves dash against each other, thunder rolls, and lightning glares on all sides; the ships lose their masts and rudders, and are driven impetuously against the rocks.

PRESENTATION, **PRÆSENTATIO**, in the *Canon Law*, the act of a patron, nominating and offering his clerk to the bishop or collator, to be instituted in a benefice of his gift, which is void.

The word is formed from the ancient phrase, *praesentare ad ecclesiam*; which originally signified the patron's sending or placing a person in a church; and which itself is formed from *representare*, which, Selden observes, is used in the council of Lateran, and elsewhere, for *praesentare*.

For the difference between presentation and collation, see **COLLATION**.

By common law, a deacon, of any age, might be instituted and inducted to a parsonage or vicarage; but it was

ordained by 13 Eliz. cap. 12. that no persons under 23 years of age, and in deacon's orders, should be presented to any benefice with cure; and if he were not ordained priest within one year after his induction, he should be *ipso facto* deprived. And now, by 13 & 14 Car. II. cap. 4. no person is capable of being admitted to any benefice unless he hath been first ordained a priest; and then he is, in the language of the law, a clerk in orders. Any clerk may be presented to a parsonage or vicarage; that is, the patron, to whom the advowson of the church belongs, may offer his clerk to the bishop of the diocese to be instituted. A layman may also be presented, but he must take priest's orders before his admission. As to the right of presentation, this belongs even to an infant, who is heir of a manor to which an advowson is appendant (3 Inst. 156.); and in case of a patron's bankruptcy, the commissioners may sell the advowson. (Gibf. 794.) If the right of presentation is in coparceners, who agree in the same person, they are to join in the act of presentation; otherwise, the eldest shall have the preference, and afterwards the rest in their turns; but where the right is in joint-tenants or tenants in common, if there hath been no composition in writing to present by turns, they must join in the presentation. (1 Inst. 156. Gibf. 794.) If one be seised of an advowson in fee, and the church becomes void, the void turn is a chattel; and if the patron dies before he presents, the avoidance doth not go to his heir, but to his executor. (Watf. c. 9.) But if the incumbent of a church be also seised in fee of the advowson of the same church, and dieth, his heir, and not his executors, shall present. In the case of a bishop, who holdeth an advowson in the right of his bishopric, the void turn of a church doth not go to his executor, but the king shall present. (2 Roll's Abr. 345.) If a vicarage becomes void during the vacancy of the parsonage, the patron of the parsonage, and not the executor of the deceased parson, shall present. (Ibid. 346.) If a feme-covert hath a title to present, the presentation must be by husband and wife in both their names. And though the right of patronage in the wife descends to her heir, yet the right of presenting during life belongs to the husband, who is tenant by curtesy. (Gibf. 794. Watf. c. 9.) If a man that is seised of an advowson takes a wife, and dieth, the heir shall have two presentments, and the wife the third. (Watf. c. 9.) In case of a mortgage in fee of a manor, to which an advowson is appendant, although the legal right of presentation is vested in the mortgagee, yet a court of equity will compel the ordinary to institute the clerk of the mortgager any time before foreclosure. (Str. 403.) But if the advowson itself only is mortgaged, the mortgagee presents. (2 P. Will. 404.) The king, as patron paramount of all the benefices in England, hath a right to present to all churches not regularly filled by other patrons, whether it happens by lapse, or through incapacity to present, as if the patron be attainted, outlawed, or an alien, or have been guilty of simony, &c. On this ground, the king hath a right to present to all dignities and benefices of the advowson of archbishoprics and bishoprics, during the vacation of the respective sees. (Gibf. 763. Watf. c. 9.) And it is said, that this privilege which the king hath of presenting, by reason of the temporalities of a bishopric being in his hands, shall be extended unto such preferments to which the bishop of common right might present, though by his composition he hath transferred his power unto others. (Watf. c. 9. 2 Roll's Abr. 343.) Upon promotion of any person to a bishopric, the king hath a right to present to such benefices or dignities, as the person was possessed of before such promotion, though the advowson belongeth to a common person. (Gibf. 758. 763.) But by law in Ireland, no person can accept a

bishopric there, until he hath resigned all the preferments which he hath in England; which preferments being void before the acceptance of the bishopric, the king in such case shall lose the presentation. The lord chancellor, or lord keeper of the great seal for the time being, hath right to present to the benefices appertaining to the king, of the yearly value of 20*l.* or under in the king's books. (Gibf. 764.) For a presentee to have another benefice, although it be above the value of 2*l.* a-year in the king's books, is no cause of refusal, for that is at his own peril, and the former benefice only becomes void in such case. God. 271. Watf. c. 20.

It is rule of the canon law, that no person may present himself: in this case, the legal and regular way is to make over the right to some other before the avoidance. Gibf. 794.

The presentation must be tendered to the bishop within a hundred and eighty-two days after the living is vacant, else it lapses to the bishop; and if the bishop do not collate in half a year more, it lapses to the archbishop; and from him, in a like time, to the king; who may stay as long as he pleases; for *nullum tempus occurrit regi*. See LAPSE.

By some customs a lay patron has only four months time to make his presentation in; and if he have presented a person incapable, he may vary it, and make a new presentation within the four months.

It is said that presentation may be made either by word, or by writing. If it be by word, the patron must declare in the presence of the ordinary; if by writing, it is no deed, but in the nature of a letter missive to the bishop. 1 Inst. 120. 2 Roll's Abr. 353.

Where a corporation aggregate of many doth present, it must be under their common seal (Gibf. 794.); and since the statute of frauds and perjuries, (29 Car. II. cap. 3.) it is necessary that all presentations shall be in writing. Thus also by the several stamp-acts, which enact a stamp-duty of 20*l.*, provided that the benefice, &c. presented to, be of the yearly value of 10*l.* or upwards in the king's books; but if under that, only 10*l.*

Presentation may be revoked or varied before admission and institution. But when a clerk is presented, the bishop may refuse him on various accounts: as, 1. If the patron is excommunicated, and remains in contempt forty days. (2 Roll. Abr. 355.) Or, 2. If the clerk be unfit; (Glanv. l. 13. c. 20.); which unfitness is of several kinds. First, with regard to his person; as if he be a bastard, an outlaw, an excommunicate, perjured, guilty of forgery or simony, under age, or the like. (2 Roll. Abr. 356. 2 Inst. 632. stat. 3 Ric. II. c. 3. 7 Ric. II. c. 12.) Secondly, with regard to his faith or morals; as for any particular heresy, or vice that is *malum in se*; but if the bishop only alleges in general terms, as that he is *schismaticus inveteratus*, or objects a fault that is *malum prohibitum* merely, as haunting taverns, playing at unlawful games, or the like, it is not good cause of refusal. (5 Rep. 58.) Or, lastly, the clerk may be unfit to discharge the pastoral office for want of learning. In any of which cases the bishop may refuse the clerk. In case the refusal is for heresy, schism, inability of learning, or other matter of ecclesiastical cognizance, there the bishop must give notice to the patron of such his cause of refusal, who, being usually a layman, is not supposed to have knowledge of it; else he cannot present by lapse; but if the cause be temporal, there he is not bound to give notice. (2 Inst. 632.) If an action at law be brought by the patron against the bishop for refusing his clerk, the bishop must assign the cause. If the cause be of a temporal nature, and the fact be admitted (as,

for instance, outlawry), the judges of the king's courts must determine its validity, or whether it be sufficient cause of refusal; but if the fact be denied, it must be determined by a jury. If the cause be of a spiritual nature (as heresy, particularly alleged), the fact, if denied, shall also be determined by a jury; and if the fact be admitted or found, the court upon consultation, or advice of learned divines, shall decide its sufficiency. (2 Inst. 632.) If the cause be want of learning, the bishop need not specify in what points the clerk is deficient, but only allege that he is deficient (5 Rep. 58. 3 Lev. 313.); for the statute 9 Edw. II. stat. 1. cap. 13. is express, that the examination of the fitness of a person presented to a benefice belongs to the ecclesiastical judge. If the bishop returns the clerk to be *minus sufficiens in literatura*, the court shall write to the metropolitan, to re-examine him, and certify his qualifications; which certificate of the archbishop is final. (2 Inst. 632.) Burn's Eccl. Law, vol. i. art. *Benefice*. Blackst. Com. book i. cap. 11. See INSTITUTION and INDUCTION.

PRESENTATION of the *Virgin*, is a feast of the Romish church, held on the twenty-first of November, in memory of the Holy Virgin's being presented by her parents in the temple, to be there educated.

Emanuel Comnenus, who began to reign in 1143, makes mention of this feast in his Constitution. Some even imagine it to have been established in the 11th century, among the Greeks; and think they see evident proofs of it in some homilies of George of Nicomedia, who lived in the time of Photius. Its institution in the West is ascribed to Gregory XI. in 1372.

Some take it to have been instituted in memory of the ceremony practised among the Jews for their new-born females; corresponding to the circumcision on the eighth day for males.

PRESENTATION of *Our Lady*, also gives the title to three orders of nuns.

The first, projected in 1618, by a maid named Joan of Cambray. The habit of the nuns, according to the vision she pretended to have, was to be a grey gown of natural wool, &c. but this project was never accomplished.

The second was established in France, about the year 1627, by Nic Sanguin, bishop of Senlis. It was approved by Urban VIII. This order never made any great progress.

The third was established in 1664, when Fred. Borromeo, being apostolical visitor in the Valteline, was intreated, by some devout maids at Morbegno, to allow them to live in community in a retired place; which he granted, and erected them into a congregation under the title of *congregation of our Lady*. They live under the rule of St. Augustine.

PRESENTATIVE ADVOWSONS. See ADVOWSON.

PRESENTTEE, in the *Canon Law*, a clerk presented by a patron to a collator. See PRESENTATION.

PRESENTMENT, in *Law*, a denunciation or information of the jurors themselves, which the grand jury find and present to the court, without any indictment delivered to them, which is afterwards reduced into the form of an indictment; or of some other officer, as a justice, constable, church-warden, surveyor, &c. of an offence, inquirable into the court to which it is presented.

Presentments are made in courts leet and courts baron, before stewards; and in the latter of surrenders, grants, &c.

PRESENTMENT, *Affise of Darrein*. See ASSISE.

PRESENTMENT of *copyhold Surrenders*. See SURRENDER.

PRESENTS, PRÆSENTIA, *free gifts*, or *gratuities*, especially

cially those given by the clergy, or the states of a realm, to a king.

They are so called, because given into the hands of a person present; by which they are distinguished from *munera*, *gifts*, which are sent to the party, or delivered by the intervention of a third person.

Thus the eighteenth law, "De verb. signif. Absentibus res donari dicuntur, munera autem mitti, & præsentia offerri." There is no accosting the eastern princes without making them fine presents. Kings usually make rich presents to ambassadors sent to their courts.

PRESENZANO, in *Geography*, a town of Naples, in the Lavora; 11 miles N.E. of Sezza.

PRESEPE, or PRÆSEPE, in *Astronomy*, a name given to three nebulous stars in the breast of the sign Cancer, or the Crab. Two of them are of the seventh, the third of the sixth magnitude.

PRESERVATION of *Vegetables*. This is to be done several ways in the several kinds, and many more might certainly be invented, for we are not yet arrived at the perfect method of preserving vegetables with their colours, odours, and all their sensible qualities, as well as their natural form, for a number of years. Fruits may be long preserved in spirits of wine, first well saturated with the skins and tinged parts of those fruits; and many may be tolerably preserved in perfectly fermented liquors, which generate no more air. The more solid vegetable substances may be preserved by gentle drying in the sun-shade, or other slack heat. Thus peas or beans may be dried young in a slack oven, in their proper season, and may afterwards be boiled in the winter, and will eat young and tender, as if just gathered. The ways of preserving fruit both dry and moist, with sugar, are now universally known; and there are in the several ways many secrets in the hands of particular artists, which it would be well to have generally known. See *Preservation of FLOWERS*.

PRESERVATION of *Provisions*. See PROVISIONS.

PRESERVATIVE, or PREVENTIVE, in *Medicine*, a remedy or expedient employed by way of precaution, or to secure a person from a disease which he is in danger of receiving.

These preservatives have been especially objects of research, during the prevalence of epidemic and contagious diseases; and many medicines have been declared to possess specific preservative powers against the plague, and other fevers. But a more enlightened experience has decidedly exploded these pretended preventives, as possessed only of imaginary powers. We are possessed of no antidote to contagion, which can only be disarmed of its virulency by dilution with fresh air, or by decomposition by chemical fumigations; and all the pretended personal preservatives, such as camphor, vinegar, &c. are totally destitute of any such qualities. The best preservative is a system of diet and regimen, which shall retain the constitution in an equable state of health, and avoid disturbance to any individual function or organ; *i. e.* in other words, a careful avoidance both of the predisposing and exciting causes of disease in general: for under this regular condition of the habit, the particular cause of disease, that may be prevalent, will have less influence upon the health. It is important, therefore, to caution the reader against putting such implicit confidence in any preventive drug, as to induce him to neglect the salutary measure of self-preservation, to which we have just alluded. See CONTAGION and EPIDEMIC.

Dr. Wenceslaus Dobr. Zensky de Negro Ponte gives us an universal preservative against infection in all diseases. "Whoever," says he, "in conversing with patients of any

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kind, would preserve himself from infection, must, while he is within the sphere of their effluvia, never swallow his spittle, but spit it out." For this author conceives it to be the spittle that first imbibes the infection.

PRESERVING of *Timber*. See TIMBER.

PRESICIE, in *Geography*, a town of Naples, in the province of Otranto; 3 miles W.S.W. of Aleffano.

PRESIDENT, PRÆSES, an officer created, or elected, to *preside* over a company, or assembly; so called in contradistinction to the other members, who are termed *residents*.

It is of some importance to ascertain the powers possessed and exercised by the presidents of the Roman provinces.

From Ulpian, a celebrated Roman lawyer, who flourished in the beginning of the third century, we learn that it was the duty of a good president to preserve tranquillity in his province, and to hunt diligently after sacrilegious persons, robbers, men-stealers, and thieves, and to punish every man according to his guilt; and he expressly ascribes to them the right of power of the sword for the punishment of malefactors, and the highest authority in his province next to the emperor. Hermogenianus says, that governors and presidents of provinces have the cognizance of all causes, which belong to the prefect of the city, or the prefect of the pretorium, and the consuls, and pretors, and other magistrates at Rome. From these, and other authorities that might be cited, it appears that the governors of provinces had not only the power of life and death, but that they were also the supreme judges in matters of property. Accordingly Pilate had the power of life and death in Judea. It was also usual for the presidents to have a council, consisting of their friends, and other chief Romans in the province, of whose advice they availed themselves on particular occasions. We have many authentic testimonies in behalf of the equity of the Roman government in general, and of the impartial administration of justice by the Roman presidents towards all the people of their provinces, how much soever they differed from each other in matters of religion. Although many of these presidents were guilty of extortion, and other acts of injustice, and endeavoured to enrich themselves in the provinces, yet there seems not to have been any one thing, which the Romans were more concerned to preserve inviolable, than the religion of all the people whom they conquered. It is, however, to be lamented that the Romans afterwards departed from those moderate maxims that directed and governed their conduct, as long as the history of the Acts of the Apostles reaches. Nero appears to have been the first emperor that persecuted the Christians; and his persecution was owing, not so much to the differences that subsisted between the principles of religion maintained by the Christians and the Romans, as to his wish to throw off from himself the odium of having set fire to the city, with which infamous action he was generally charged.

Lord President of the Council is a great officer of the crown, who has precedence next after the lord-chancellor and lord-treasurer; as ancient as the time of king John, when he was styled *consiliarius capitalis*.

His office is to attend on the king, to propose business at the council chamber, and to report to the king the several transactions there. See PRIVY-COUNCIL.

PRESIDENT of the *United States of America* is the person in whom the constitution has vested the executive power. He holds his office during the term of four years, and, together with the vice-president, chosen for the same term, is elected in the following manner. Each state shall appoint, as its legislature may direct, a number of electors, equal to the whole number of senators and representatives to which the state may be entitled in the congress; but no senator or

representative, or person holding an office of trust or profit under the United States, shall be appointed an elector. The electors meet in their respective states, and vote, by ballot, for two persons, of whom one at least shall not be an inhabitant of the same state with themselves. Having made a list of all the persons voted for, and of the number of votes for each, they sign and certify this list, and transmit it, sealed, to the seat of the government of the United States, directed to the president of the senate. The president, in the presence of the senate and house of representatives, opens all the certificates, and the votes are counted. The person having the greatest number of votes shall be the president, if such number be a majority of the whole number of electors appointed; and if there be more than one who have such majority, and have an equal number of votes, then the house of representatives shall immediately choose, by ballot, one of them for president; and if no person have a majority, then, from the five highest on the list, the said house shall, in like manner, choose the president. But in choosing the president, the votes shall be taken by states, the representative from each state having one vote. A quorum for this purpose shall consist of a member or members from two-thirds of the states, and a majority of all the states shall be necessary to a choice. In every case, after the choice of the president, the person having the greatest number of votes of the electors shall be the vice-president. But if there should remain two or more, who have equal votes, the senate shall choose from them, by ballot, the vice-president.

No person, except a native citizen, or a citizen of the United States at the time of the adoption of the constitution, shall be eligible to the office of president; neither shall any person be eligible to that office, who shall not have attained to the age of 35 years, and been 14 years a resident within the United States. The president shall, at stated times, receive for his services a compensation, to be neither increased nor diminished during the period for which he shall have been elected; and he shall not receive, within that period, any other emolument from the United States, or any of them. Before he enters on the execution of his office, he shall take the following oath or affirmation: "I do solemnly swear (or affirm) that I will faithfully execute the office of president of the United States, and will, to the best of my ability, preserve, protect, and defend the constitution of the United States." As to his powers and duties, he shall be commander-in-chief of the army and navy of the United States, and of the militia of the several states, when called into the actual service of the United States. He may require the opinion, in writing, of the principal officer in each of the executive departments, upon any subject relating to the duties of their respective offices; and he shall have power to grant reprieves and pardons for offences against the United States, except in cases of impeachment. He shall have power, by and with the advice and consent of the senate, to make treaties, provided two-thirds of the senators present concur; and he shall nominate, and by and with the advice and consent of the senate, shall appoint ambassadors, other public ministers and consuls, judges of the supreme court, and all other officers of the United States, whose appointments are not otherwise provided for, or shall be established by law. But the congress may, by law, vest the appointment of such inferior officers as they think proper in the president alone, in the courts of law, or in the heads of departments. The president shall have power to fill up all vacancies that may happen during the recess of the senate, by granting commissions, which shall expire at the end of their next session. He shall, from time to time,

give to the congress information of the state of the union, and recommend to their consideration such measures as he shall judge necessary and expedient: he may, on extraordinary occasions, convene both houses, or either of them; and, in case of disagreement between them, with respect to the time of adjournment, he may adjourn them to such time as he shall think proper: he shall receive ambassadors, and other public ministers: he shall take care that the laws be faithfully executed, and shall commission all the officers of the United States.

The president, vice-president, and all civil officers of the United States, shall be removed from office on impeachment for, and conviction of, treason, bribery, or other high crimes and misdemeanors.

PRESIDIAL, a tribunal or bench of judges, formerly established in the several considerable cities of France, to judge ultimately, or in the last resort, of the several causes brought before them, by way of appeal from the subaltern judges. The presidials make one company with the officers of the bailliages and seneschauſſees, where they are established:

The edict of 1551 establishes presidials, under these two conditions: first, that they may judge definitely, and without appeal, to the sum of 250 livres, or 10 livres *per annum*: and, secondly, to the sum of 500 livres, or 20 livres *per annum*, by provision.

When they judge in the former case, they are obliged to pronounce it with these words, *par jugement dernier*; in the latter, *par jugement présidial*.

When they judge finally of appeals from inferior judges, they may not pronounce the sentence or appeal, *au neant*, void; that form only belonging to the sovereign courts; but are to pronounce simply, that *it has been well or ill-judged*. To judge presidially and finally, they must be at least seven in number.

PRESIDII, *Stato di gli*, in *Geography*, a small district or province, situated on the coast of the Mediterranean, in the territory of Etruria, under the dominion of the king of Naples. Its capital is Orbitello.

PRESIDIO de Cerro, a town of Mexico, in New Biscay; 150 miles N. of Durango.

PRESIDIO de Janos, a town of New Navarre; 270 miles S.E. of Casa Grande. N. lat. 30° 95'. W. long. 109° 6'.

PRESIDIO de St. Juan, a town of New Mexico, in the province of New Leon. N. lat. 29° 11'. W. long. 101° 46'.

PRESLE, a town of France, in the department of the Aisne; eight miles E.N.E. of Soissons.

PRESNITZ, a town of Saxony, in Thuringia; two miles S.E. of Camburg.—Also, a town of Bohemia, in the circle of Saatz; 14 miles N.W. of Saatz.

PRESIPA, a town of European Turkey, in Macedonia; 11 miles N.N.E. of Akrida.

PRESQUE ISLE, a small peninsula, on the S.E. shore of lake Erie, S. of Long Point, on the opposite side of the lake; 15 miles from fort Bœuf, and 60 N. by W. from Venango, on Alleghany river. The garrison is upon a commanding spot, just opposite to the entrance of the bay. The town commences 30 yards W. of the old British fort, leaving a vacancy of 600 yards for a military parade and public walk. The town extends three miles along the lake and one mile back. It has the best harbour on the S. side of the lake. N. lat. 42° 45'. W. long. 82° 20'.

PRESQUE Island, an island near the N. coast of lake Ontario. N. lat. 43° 52'. W. long. 78°.

PRESQUE Isle, an island in lake Huron. N. lat. 45° 4'. W. long. 83° 4'.—Also, an island in the river St. Lawrence,

Upper Canada, in Edwardburgh, nearly opposite to Hospital island, and above Pointe au Gallope.

PRESQUE Isle Major, an island in the river St. Lawrence, in front of the township of Matilda, above Point Iroquois.

PRESS, a machine of most extensive use in the mechanic arts, for squeezing or compressing any substance very close, and also to retain the matter under the pressure as long as may be required.

All presses consist of the following parts: 1st, two flat, smooth tables of wood or metal, between which the substances to be pressed are placed; 2dly, the frame, or cheeks of wood or metal, which unite and retain the two together; and 3dly, the mechanical power, by which the pressure is effected. This is generally a screw, or two screws, turned by a long lever, or by wheelwork. At other times a rack is employed, and moved by a pinion turned by wheelwork, to give it a great power. Some presses used for expressing of oils are actuated by a wedge driven by a hammer or stamper, (see *OIL-Mill*), and in others, the pressure is produced by means of a powerful lever, and retained by a rack and click. Of late years the hydrostatic press has been produced, acting by the pressure of water or other fluids in cylinders. We shall now speak of the different kinds of presses.

Screw-presses are those in which the pressure is caused by means of one or more screws; the most common have a single screw, formed either of wood or iron, which at its lower end has a globe-head, with four holes through it, for the reception of the end of the lever employed to turn the screw; the thread of the screw is fitted through a nut, fixed fast in the head of the wood, or iron frame of the press. This frame consists of a lower bed, or horizontal piece, on which the matters to be pressed are laid, two upright cheeks being firmly united with it, and supporting the head, or upper horizontal piece of the press, in which the nut of the screw is fixed; the lower point of the screw is united with the follower, or moving bed of the press, and this rests upon the substances to be pressed, and the power of the screw forces it down upon it.

A drawing of this press, with its lever, and also a windlass to work it with immense power, will be found in *Plate XI. Agriculture*, as applied to express the juice of fruit for cider. The same kind is also employed for expressing some vegetable oils, but generally with iron framing, because of the great strength required; for packing cloth, paper, and other goods; also in the paper-mills, for flattening and rendering paper solid; and in the manufacture of woollen cloth, for glazing and setting a finish upon the article in its last stage.

Two elevations of a very good screw-press for a paper-mill are given in *figs. 6 and 7 of Plate II. Paper-Mill*. *A A* is the bed, formed of an immense beam of oak; and each of the cheeks, *B*, consists of a long iron bar *b b*, (*fig. 7.*), the ends of which are welded together, so that it forms a long link, one end of which receives the end of the bed *A*, and the other the end of a massive cast-iron cross bar or head *D*, through which the screw, *E*, is received, and its nut fixed fast therein. The open spaces of the long links or cheeks, *b, b*, are filled up by rails of wood, *C*, which support the weight of parts of the press when it is not in action, but these bear nothing, when the press has any articles under pressure in it; these articles are laid at *H*, on the bed, and the follower, *G*, is pressed upon them by the screw, when it is turned by a long lever put through the holes in the screw-head *F*. The screws employed for paper presses are generally formed with such coarse threads, and so rapid a spiral, that the elasticity of the paper is sufficient to force it

to run back. To these a ratchet-wheel, *a*, is fixed, and a click, *c*, (*fig. 8.*) is applied to its teeth: to prevent its return, the click is supported on a bar *b d*, which moves on a centre at *B*, but the other end is retained by a catch or lever *f g*. When the press is to be relieved, the end, *f*, of the catch is driven back; this relieves the bar *d b*, and the click no longer detaining the ratchet-wheel, the screw runs back.

The screws for presses were formerly made of wood, with sharp threads, that is, the worm of the screw, if cut across, would make a triangular section, the base thereof abutting upon the cylinder of the screw. In this method it was necessary to have the threads very coarse, to give them sufficient strength, and then the power of the screw was not so great as in the modern presses, where the screws are made of iron, and their threads need not be above one-third or fourth the distance asunder, to have the same strength.

Another advantage of the iron screw is, that the friction is so much diminished, that a far greater pressure can be obtained by the same exertion of the people who work it. The frames of the modern presses are also made of iron, wood being found incapable of resisting the strain of a severe pressure, for any considerable length of time; as all the fibres, even of the hardest oak, become separated into ribbands, and then break one at a time, till the whole beam fails.

Another kind of screw-press consists of two screws, which are immovably fixed in the lower board or bed, and passing through holes in the upper board, have nuts upon them, which being turned by a lever, draw the two boards together, and exert a pressure upon any thing placed between them. Sometimes the screws pass through the upper board, and are tapped into the lower one; then the screws themselves are turned round by a lever put through their heads, instead of turning the nuts. Presses of this kind, when accurately made, have a communication of wheelwork from one screw to the other, so that both shall turn round together, and cause the two boards of the press to advance parallel to each other.

A very ingenious and useful packing press, invented by Mr. John Peck, was, in 1768, rewarded by the Society of Arts. This machine consists of two very strong horizontal beams, one at the bottom for the bed, and the other at the top of the press. These are united by two iron screws, which stand in a vertical position, and therefore serve as cheeks to the press. The follower of this press is a very strong horizontal beam, having two nuts fitted into it at its ends. These nuts act upon the threads of the two vertical screws; and, therefore, it is plain when they are turned round, the follower will rise and fall upon them. The nuts are so fitted into the follower, as to admit of a circular motion round the screws, but are not permitted to rise or fall without the follower, because they have a circular ring or projection in the middle of their length, which is fitted into a proper receptacle in the wood-work. To give them motion, the edges of the circular rings are cut into cogs or teeth, and are turned by means of an endless screw for each, situated at the opposite ends of a horizontal spindle, which revolves in bearings attached to the follower of the press. The spindle has a winch at each end, by turning which, the two endless screws act upon the wheels or teeth of the nuts; and by thus causing them to turn round with equal velocities, raises or depresses the follower, always parallel to itself, and also to the head and bottom bed.

The great utility of this press consists in its being capable of packing two sets of bales at once; thus answering the

purpose of two presses, and with more expedition. It is placed upon the floor of the warehouse in which the packing is to be performed, and behind it a stage is erected, just half the height of the whole press; then one set of the bales are made up on the floor, and the other upon the stage. Suppose the follower raised up above the level of the stage, a bale of goods is placed on the lower bed, and by turning the winches, the follower is forced down upon it, till it is sufficiently pressed: now, while the men below are tying and making the bale fast, the people on the stage place a bale upon the follower; and it is plain, that when the follower is raised up to relieve the lower package, the upper bale will be compressed between the follower and the head of the press; and while this is making fast, the workmen below get another bale of goods loaded in. By this means no time is ever lost in screwing up or opening the press; for it performs work both ways, which is a matter of no small importance in large works, such as the East India Company's warehouses, where such a great number of people are employed in packing.

In the Philosophical Transactions for 1781 is an account of a double screw, applied to a press, by Mr. W. Hunter. To explain this, we must suppose a single screw-press of the ordinary form, such as shewn in *Plate XI. Agriculture*, or *Plate II. Paper-Mill*; but the lower end of the screw, which rests upon the follower or presser, has a second screw of finer thread cut upon it. This thread is received into a nut or barrel, which rests upon the presser. The nut is at liberty to turn round freely upon the presser, except when it is required to be stationary; and then, by a key, it can be fixed fast to it. In like manner, the nut or barrel can, at pleasure, be fixed fast to the lower screw by a key put through a hole in both; and in this state they will of course turn round together. As the nut and lower screw take up some room, the screw is turned by arms fixed in a head, formed on the upper end of it, above the press. In the operation of this press, the nut or barrel is pinned fast to the lower screw by the key; and the screw being turned by the arms at top, the nut is carried round with it, and the effect is exactly the same as an ordinary screw-press. But having by this means given as great a pressure as the single screw is capable of producing, the cross key which unites the lower screw to the barrel is removed, and is put in such a position, that it unites the barrel to the presser, so as to prevent its turning round upon it. The effect of the press now becomes compound, and while the whole screw is carried downwards by the revolution of the great screw, the fine screw at the bottom of it screws down into the barrel or nut, which is attached to the presser; which is, therefore, carried down a quantity only equal to the difference of the thread of the two screws; and if these are made very nearly alike, the descent produced by the difference between them will be exceedingly small, and the power exerted upon the articles under pressure will be in proportion to it. Indeed the effect would be the same, as if a single screw had been employed, having its threads so fine or close together, that the difference between thread and thread is only equal to the difference between the measures of the threads of the two screws.

For example: Suppose it was required to produce a strong pressure, with a screw of ten threads in an inch, it is evident that the metallic protuberance, or helix of the screw, could not be quite so thick as one-twentieth of an inch, and could not, therefore, withstand any considerable force. By the present construction, we may have the thread as strong as can be desired. Thus, if the slightest be a quarter of

an inch, the finest screw must have two turns in the inch, and the coarsest two turns in one inch and one-tenth; or, in other words, it would pass over the same space in ten turns, that the other screw would in eleven.

Upon the invention of the double screw Mr. Nicholson remarks, that from the extreme precision of a simple screw, if commonly well made, it may seem scarcely necessary to use this contrivance in the measurement of small quantities. The finest screws usually to be met with do not exceed 100 threads in the inch, and few have been made finer than of 200 threads in that space. Let us consider by what threads, of usual, or even coarse numbers, we could have a difference *per* turn of above one-thousandth of an inch, and we shall find that the difference between a thread of 32 and one of 33 in the inch, is the 1056th part of an inch; so likewise, the difference between the 60th and 61st parts of an inch is the 3660th part.

The *Hydrostatic* or *Water Press* has, for a great number of purposes, superseded the use of the screw-press, over which it possesses great advantages, in all cases where a strong pressure is required. This machine was invented by Mr. Joseph Bramah, and its principle has been explained in our article *MACHINERY*. (See vol. xxi.) In plate *Press* we have given drawings of one of them, *figs. 1* and *2* being elevations, taken in opposite directions; *A A B c c* is the frame, consisting of a piece of cast iron, *c c*, (see also *fig. 3.*), and a top piece of cast iron, *B*, (see also *fig. 4.*), the two being united by the wrought iron bolts *A, A*, which must have sufficient strength to resist the whole force of the press, the pressure being produced between the under surface of *B*, and the upper surface of an iron table or follower, *E*; *F* is a strong metallic cylinder, in which the rammer or piston, *D*, moves. To the upper part of this piston, the iron table, *E*, is fixed, by the motion of which upwards, the pressure is communicated to the articles placed upon it; *L* represents a cistern containing water; within this cistern is fixed a small forcing or injecting pump, of which *b* is the piston rod, and *H* the lever by which it is worked, a contrivance being introduced for keeping the piston rod vertical during the working: it consists of a guide, formed at the top, of the same standard, *K*, which supports the fulcrum or centre pin, *e*, of the lever *H*; the rod *g*, which is part of the piston rod, slides through the socket; the part, *f*, of the rod is made open, to admit the lever to pass through it, a link being applied to unite the lever to the rod; *I* is a counterbalance for the weight of the lever. *Fig. 5.* is a section of the pump, on a larger scale, to shew its interior structure, *b* representing the lower extremity of the piston rod; it is surrounded by a collar of leather, *s*, which is retained in its place by a tube, or perforated screw, *r*, which admits the passage of the piston rod *b*, but which screws the two-cupped leathers with the metal ring, which is interposed between them, close down to a shoulder, is the body of the injecting pump, and thus renders the junction between the injecting piston *b*, and its cylinder, water-tight: the upper part of the screw, *r*, is excavated, to form a receptacle for oil; *M M* is the barrel, or chamber of the pump, in which the piston rod does not fit; but the collar of leather *s*, closely embracing the rod, will have the same effect of enlarging or diminishing the capacity of the chamber when the rod is moved up and down. In the bottom of the chamber is a suction valve, *N*, which allows the water to enter into the barrel from the cistern, but will not permit it to return in the same direction; it is fitted into the upper part of a tube, *N*, which is screwed into the lower end of the barrel: the valve itself consists

consists of a metallic rod, at one end of which there is a knob turned conical next the stem, so as accurately to fit the conical face of the hole into which it is put; the tail is filed on one side, so that it does not entirely fill the cylindrical hole which it occupies, by which means a passage is afforded for water when the head of the valve is raised. A valve of a similar nature is placed at *t*, in the upper part of the pump, and being in the passage which conveys the water from the pump, and through the copper pipe, *b*, to the cylinder, *F*, it allows the water to pass from the pump to the cylinder, and prevents its returning. At *k*, *fig. 5*, is a safety-valve, which is loaded by a steelyard and weight, as shewn at *k*, *fig. 1*: this keeps the valve shut in the ordinary course of working; but if the pressure should become so great as to endanger the bursting of the pipes, the valve rises, and the water escapes. At *i* is a screw plug, or valve, at which the water is discharged, when the press is to be relieved. When screwed tight, its conical end or point is forced into a corresponding socket, and prevents the escape of the water; but on turning the screw back, the water is permitted to flow back into the cistern. The real situation of this discharging valve is shewn in *fig. 1*, at *i*. The cylinder, *D*, is surrounded by a collar of leather at *o o*; the leather is formed as shewn in *fig. 7*, being turned up to form a double cup, so that it resembles the cuff of a coat sleeve. When in its place it is kept distended by the copper ring, *p*, entering the circular channel, or fold, of the leather. This ring has a lodgment in a recess formed within the cylinder *F*. The leather is kept down by a brass or bell-metal ring, *m*, which is received into a recess formed round within the cylinder, as shewn in *fig. 5*. The interior aperture of this ring is adapted to receive the cylinder *D*, and thus the leather becomes confined in a cell, with the edge of the interior fold applied to the cylinder *D*, whilst the edge of the outer fold is in contact with the interior surface of the cylinder *F*. In this situation the pressure of the water, acting between the folds of the leather, forces its edges into close contact with both, and makes a tight fitting round the cylinder, and as the pressure is increased the leather is applied more closely, so as to prevent leakage under any circumstances. The metal ring, *m*, is truly turned in the lathe, and the cavity or cell formed for its reception; then to get it into its place, it is divided by a saw into five segments, as shewn in *fig. 6*. Three of the lines at which it is divided point to the centre, but the other two are parallel to each other, and the ring is put into its place (after the leather and copper rings are introduced), by putting in the four segments separately, and the one with parallel sides is put in last. The cylinder, *D*, is then put down in its place, and ready for action. This plan of a divided ring was first used by Mr. Peter Kier, who, since the expiration of Mr. Bramah's patent, has made several hydrostatic presses. In the original construction, the ring or head of the cylinder, which kept down the leather cup, was held down in its place by several screw bolts, but as these had to bear a greater force than the whole power of the press, they were frequently torn out, or strained, so as to cause leakage. The upper part of the cylinder above the ring, *m*, is filled with tow, or other soft packing, impregnated with sweet oil, which is confined by a thin plate or ring. This packing serves at once to supply the cylinder with oil, and to prevent the admission of any substance which might injure the surface of the piston.

The pipe, *b*, is made of copper, and its joints are made as shewn in *fig. 5*. The end of the pipe has a projecting piece soldered or screwed upon it, and this fits into a cavity formed in the metal of the pump or cylinder, and it is forc-

bly pressed into its seat by a perforated screw *w*, which screws into the cavity. The joints are rendered tight by a leather ring or washer, interposed between the end of the pipe and the bottom of the cavity in the cylinder or pump.

The hydrostatic press is not liable to get out of order, but if any extraneous matter attaches itself to either of the valves, their action will necessarily be suspended till it be removed; for this purpose the valves can be taken out. The valve at *t* has a screw plug, *g*, fitted over it, and this regulates the ascent of the valve, or by unscrewing the plug the valve can be taken out. To get access to the lower valve, the lower piece, *N*, of the pump must be unscrewed. The discharging valve, *i*, may also be examined by withdrawing its screw.

The operation of this press may be very readily comprehended, by supposing the pump, cylinder, and connecting pipe *b*, to be filled with water, and that an adequate supply of water is contained in the cistern *L*. When the handle of the lever, *H*, is raised, it brings up the piston *b*, which would leave a vacuum beneath, if the atmosphere did not force the water through the lower, or suction valve, of the pump. The lever being then pressed down, the piston rod, by descending, diminishes the capacity of the pump; this causes the lower valve to shut, and forces the water through the valve *t*, whence it passes, by the pipe *b*, into the cavity of the great cylinder *F*, and raises the piston *D*, and pressing-table *E*, together with its load, a distance proportioned to the quantity of fluid injected. On the subsequent rise of the piston of the pump, the descent of the upper valve prevents the return of the water, and consequently the fall of the cylinder *D*. A repetition of the same process injects more water, and the pressure may, in this manner, be carried to a great extent. When it is proposed to relieve the action of the press, the discharge valve, *i*, must be opened by turning the screw back; the water then escapes out of the press into the cistern *L*, and consequently the table *E*, and the cylinder *D*, descend by their own weight, restoring the engine to its original situation.

The mechanical effect of the hydrostatic press will admit of an easy calculation. For it is known, that if there be a mutual communication between two columns of any fluid, whatever pressure or effort may be exerted on the one, will be transmitted to the other in a ratio proportional to the respective area of each column, consequently the proportion of the area of the injecting pump to that of the cylinder constitutes the hydrostatic power of the press, and the mechanical effort exerted on the injecting pump is transmitted to the cylinder *D*, by the intervention of the fluid, in a ratio proportional to their comparative areas.

If the diameter of the piston, *b*, be one quarter of an inch, and that of *D* one inch, that is to say, four quarters of an inch, one pound lodged upon the piston rod, *g*, will be in equilibrio with sixteen pounds lodged upon the table *E*, the weights of the parts of the engine attached to, and moving with each piston, being respectively included. And if the length of the lever, *e H*, be fifteen inches, and the distance between the centres of motion, *e f*, of their action upon the piston rod two inches, one pound at the end of *H* will gain an advantage of $7\frac{1}{2}$ times, when compared with that at *g*. Instead, therefore, of sixteen pounds, upon the table *G*, being equal in effect to counterpoise this last action, there will be required upwards of 120 pounds. But a man in this action of pumping, by a downward pressure, can, without difficulty, apply his whole weight, and with great ease one-third, or one-fourth, of his weight, suppose 50 pounds. In this case the pressure will be equivalent to 50 times 120 pounds, or 6000 pounds, that is to say, nearly three tons.

To compare this engine with a screw in theory, we must enquire what fineness of thread, and length of lever, would afford a purchase of 120 to 1. Let us suppose the thread of a screw, substituted in the place of the cylinder D, to be one-tenth of an inch thick, the distance from the top of one thread to the top of the next, will in this case be one-fifth of an inch. This is the space through which the weight must rise in one revolution of the screw; the power must, therefore, move through 120 times that space, namely, twenty-four inches. A lever or radius four inches long will describe a circle somewhat larger than this, and consequently such an engine would, in theory, be equal in power to the hydrostatic engine we have been describing.

But when the subject is viewed practically, the difference between the two machines appears to be very remarkable. All practical men know how very large a part of the force, operating by means of engines, is employed in overcoming friction. Every one is aware of the extreme friction between solids, and the very slight friction which takes place between the parts of fluids. This is seen in the common expedient of oiling the pivots of wheels, and in the very gradual decay of motion in fluid bodies, while solids moving upon each other stop at once as soon as the force is diminished to a certain degree. The screw is an organ peculiarly liable to friction, and this friction is always much greater than the whole of the re-acting force, for there are few instances where a screw will return from extreme pressure, when the agency upon the lever is withdrawn. It is also to be considered, that the whole force of the weight or resistance acts directly upon the face of the thread of the screw, at the place where the motion is required to take place. It has not been ascertained in what degree this resistance or friction increases with the weight. In lighter actions the simple ratio has been inferred, but under more severe pressures, the two metallic faces exclude the greater part of the half fluid matter between them, and appear, by the magnitude of their resistance, to be attached to each other by a process of the nature of cohesive attraction.

Mr. Nicholson, in his Journal, relates the following experiments, which he made with one of Mr. Bramah's small presses, which he makes for the purpose of copying letters, or writings, in the manner of Mr. Watt (see COPYING); it had the same parts which we have described, but the frame made of wood. When employed to press papers, the force applied to the lever of the injecting pump was so slight, that the instrument required no fastening to the table on which it stood; but the effect of the upper bar, B, which was of wood, three inches and a half thick, was such, as bended it out of a straight line upwards of a quarter of an inch, and it appeared that it might have easily been broken by continuing the pressure. With a screw-press, the screw of which was iron, and nearly of the dimensions above mentioned, excepting that the lever was twelve inches long instead of four inches, and the action on the lever upwards of two hundred weight, applied with a jerk, the effect was nearly the same: he estimated the advantage to be very much in favour of the hydrostatic press.

In another press of this kind, the diameter of the great piston was four inches, and of the smaller three-eighths of an inch, and the advantage given by the lever or handle was twelve to one. Above the piston, D, of the great cylinder, was applied a long lever, at one end of which was an axis, and at the other end a large scale to hold weights; it contained twenty hundred weight. The distance between the axis of motion of this lever, and the part where it acted on the piston, was six inches; and the distance from the same axis to the extremity where the scale was hung, was one

hundred and twenty-six inches. Every hundred weight in the scale consequently pressed upon the piston with a force equal to twenty-one hundred weight, whence the whole pressure was twenty-one tons. It was easy to work the lever briskly with one hand, and each stroke raised the scale nearly one-third of an inch. Forty-seven pounds, hung at the end of the lever, carried it down with a moderate swiftness of working; but a weight of only forty-three pounds remained in equilibrio, and did not descend. Now as the true weight in theory was thirty-two pounds, as deduced from the dimension of the parts in the manner already done, with regard to the small press it follows, that less than one-third of the actual power was employed to give velocity, and overcome all friction.

It may be remarked, that the principal frictions in these presses must be at the circumference of the pistons, and that these do not increase in the simple, but in less than the sub-duplicate ratio of the power. For if the diameter of the great cylinder were double, every thing else remaining unchanged, the surface of its piston, and consequently the power, would be quadrupled, but the friction would be only doubled, and that merely at the leathering of the greater piston D.

As the pressure, in the experiment last mentioned, amounted to forty-seven thousand and forty pounds upon the great piston, of four inches diameter, and sixteen circular inches surface, it amounted to two thousand nine hundred and forty upon each round inch; but the medium pressure of the atmosphere on a round inch is nearly twelve pounds, consequently the action was equal to two hundred and forty-five atmospheres, and as each of these corresponds with a column of thirty-four feet of fresh water, at a medium the water in the cylinder was pressed in the same manner, as if the whole column had been eight thousand three hundred and thirty feet, or one mile and two-thirds perpendicular height.

Large presses of this construction are generally made with two pumps, of one inch and a quarter bore, and a cylinder of seven inches. These have been used in pressing hay and cotton for package, and are very effective in producing a greater condensation on the material, with a much less application of moving power, and consumption of time.

PRESSES used for expressing of liquors, are of various kinds; some, in most respects, the same with the common presses, excepting that the under plank is perforated with a great number of holes, to let the juice expressed run through into a tub, or receiver, underneath.

Others have only one screw, or arbor, which passes through the middle of the moveable plank, which is made to descend into a kind of square box, full of holes on all sides; through which the juices flow, in proportion as the arbor is turned; by means of a little lever applied thereto.

Press used by joiners to keep close the pieces they have glued, especially pannels, &c. of wainscot, is very simple, consisting of four members; viz. two screws, and two pieces of wood, four or five inches square, and two or three feet long; of which the holes at the two ends serve for nuts to two screws.

Press used by inlayers resembles the joiners' press, except that the pieces of wood are thicker, and that only one of them is moveable; the other, which is in form of a tressel, being sustained by two legs, or pillars, jointed into it at each end.

This press serves them for sawing and cleaving the pieces of wood required in marquetry, or inlaid work.

PRESS, Founders', is a strong, square frame, consisting of four pieces of wood, firmly joined together with tenons, &c.

This press is of various sizes, according to the sizes of the moulds; two of them are required to each mould, at the two extremities of which they are placed; so as that, by driving wooden wedges between the mould and the sides of the presses, the two parts of the mould, in which the metal is to be run, may be pressed close together.

PRESS, Printing. See *PRINTING Press*.

PRESS, Messenger of the. See *MESSENGER*.

PRESS, Auditors of the. See *AUDITORS*.

PRESS, Rolling, is a machine for the taking off prints from copper-plates.

It is much less complex than that of the letter-printers.

See its description and use under the article *Rolling-press* *PRINTING*.

PRESS, in Coining, is one of the machines used in striking of money; differing from the balance, in that it has only one iron bar to give it motion, and presses the moulds, or coins; is not charged with lead at its extreme, nor drawn by cordage. See *COINAGE*.

PRESS, Binders cutting, is a machine used equally by book-binders, stationers, and pasteboard-makers; consisting of two large pieces of wood, in form of cheeks, connected by two strong wooden screws; which being turned by an iron bar, draw together, or set asunder, the cheeks, as much as is necessary, for the putting in the books, or paper, to be cut.

The cheeks are placed lengthways on a wooden stand, in form of a chest, into which the cuttings fall. Aside of the cheeks are two pieces of wood, of the same length with the screws, serving to direct the cheeks, and prevent their opening unequally.

Upon the cheeks the plough moves, to which the cutting-knife is fastened by a screw; which has its key to dismount it, on occasion to be sharpened.

The plough consists of several parts; among the rest, a wooden screw, or worm, which catching within the nuts of the two feet, that sustain it on the cheeks, brings the knife to the book, or paper, which is fastened in the press between two boards. This screw, which is pretty long, has two directors, which resemble those of the screws of the presses. To make the plough slide square and even on the cheeks, so that the knife may make an equal paring, that foot of the plough where the knife is not fixed, slides in a kind of groove, fastened along one of the cheeks. Lastly, the knife is a piece of steel, six or seven inches long, flat, thin, and sharp, terminating at one end in a point, like that of a sword, and at the other in a square form, which serves to fasten it to the plough. See *BOOK-BINDING*.

As the long knives used by us in the cutting of books or papers are apt to jump in the cutting thick books, the Dutch are said to use circular knives with an edge all round; which not only cut more steadily, but last longer without grinding.

PRESS, in the Woollen Manufactory, is a large wooden machine, serving to press cloths, serges, rateens, &c. by which to render them smooth and even, and to give them a gloss.

This machine consists of several members; the principal of which are the cheeks, the nut, and the worm or screw, accompanied with its bar; which serves to turn it round, and make it descend perpendicularly on the middle of a thick wooden plank, under which the stuffs to be pressed are placed. The calender is also a kind of press, serving to press or calender linens, silks, &c.

PRESS, Liberty of the, in Law, consists, says judge Blackstone, in laying no previous restraints upon publications, and not in freedom from censure for criminal matter, when published; and this is essential to the nature of a free state. Every free man has an undoubted right to lay what sentiments he pleases before the public; to forbid this is to destroy the freedom of the press; but if he publishes what is improper, mischievous, or illegal, he must take the consequence of his own temerity. To subject the press to the restrictive power of a licenser, as was formerly done, both before and since the revolution, is to subject all freedom of sentiment to the prejudices of one man, and make him the arbitrary and infallible judge of all controverted points in learning, religion, and government. But to punish (as the law does at present) any dangerous or offensive writings, which, when published, shall on a fair and impartial trial be adjudged of a pernicious tendency, is necessary for the preservation of peace and good order, of government and religion, the only solid foundations of civil liberty.

The art of printing, says the same excellent writer, soon after its introduction, was looked upon (as well in England as in other countries) as merely a matter of state, and subject to the coercion of the crown. It was, therefore, regulated with us by the king's proclamations, prohibitions, charters of privilege and of licence, and, finally, by the decrees of the court of star-chamber, which limited the number of printers, and of presses, which each should employ, and prohibit new publications, unless previously approved by proper licensers. On the demolition of this odious jurisdiction in 1641, the long parliament of Charles I. after their rupture with that prince, assumed the same power as the star-chamber exercised with respect to the licensing of books; and in 1643, 1647, 1649, and 1652, issued their ordinances for that purpose, founded principally on the star-chamber decree of 1637. In 1662 was passed the statute 13 & 14 Car. II. c. 33. which (with some few alterations) was copied from the parliamentary ordinances. This act expired in 1679, but was revived by stat. 1 Jac. II. c. 17. and continued till 1692. It was then continued for two years longer by stat. 4 W. & M. c. 24; but though frequent attempts were made by the government to revive it in the subsequent part of that reign, yet the parliament resisted it so strongly, that it finally expired, and the press became properly free in 1694, and has so continued, under certain limitations, ever since.

How far these limitations and restrictions are vindicable on the learned judge's principles and declarations, (*ubi infra*), we shall not undertake to determine. It will be sufficient for us to observe, that those are inexcusable, who by abusing the liberty of the press and subjecting themselves to the just animadversion of the law, contribute to restrain it, no less than others, who by the severity of punishment inflicted on trivial violations of it occasion or justify measures for abridging this glorious privilege of Britons and palladium of the British constitution and liberties.

The learned judge says, that by the liberty of the press, as it existed in his time, "the will of individuals is still left free; the abuse only of that free will is the object of legal punishment." Neither is any restraint hereby laid upon freedom of thought or inquiry; liberty of private sentiment is still left; the disseminating, or making public, of bad sentiments, destructive of the ends of society, is the crime which society corrects. A man (says a fine writer on this subject) may be allowed to keep poisons in his closet, but not publicly to vend them as cordials. And to this we may add, that the only plausible argument heretofore used for the restraining of the just freedom of the press, "that it

was necessary to prevent the daily abuse of it," will entirely lose its force, when it is shewn (by a reasonable exertion of the laws) that the press cannot be abused to any bad purpose, without incurring a suitable punishment; whereas it can never be used to any good one, when under the controul of an inspector. So true will it be found, that to censure the licentiousness, is to maintain the liberty, of the press. Blackst. Comm. book iv.

PRESS, in the *Manege*. A horse is said to resist, or press upon the hand, when either through the stiffness of his neck, or from an ardour to run too much a-head, he stretches his head against the horseman's hand, refuses the aid of the hand, and withstands the effects of the bridle.

If your horse is too fiery, and presses upon the hand, endeavour to pacify him by making him go more softly, and pulling him backwards; and if it proceeds from a stiffness of the shoulders and neck, you must supply him with a cavesson, made after the duke of Newcastle's way. See **HEAVY**.

PRESS is also used for pushing a horse forwards by assisting him with the calves of your legs, or even spurring him, in order to make him go on.

PRESS, or *Pressing*, in *Sea-Language*. See **MANNING the Fleet**.

PRESSAS, in *Geography*, a town of France, in the department of the Lot and Garonne, and chief place of a canton, in the district of Agen. The place contains 1413, and the canton 9051 inhabitants, on a territory of 137½ kilometres, in 14 communes.

PRESSAT, a town of Bavaria; 19 miles N. of Amberg.

PRESSELUNDS, a town of Norway; 68 miles N. of Christiania.

PRESSIGNY, a town of France, in the department of the Upper Marne; 15 miles S.E. of Langres.

PRESSIGNY le Grand, a town of France, in the department of the Indre and Loire, and chief place of a canton, in the district of Loches. The place contains 953, and the canton 9000 inhabitants, on a territory of 355 kilometres, in 13 communes.

PRESSING, in the *Manufactures*, the action of violently squeezing a cloth, stuff, linen, &c. in a press, to render it even, smooth, polished, and glossy.

This, in the silken and linen manufactures, they properly call *calendering*.

There are two manners of pressing; the one *hot*, the other *cold*.

PRESSING Cold, Method of. After the stuff has had all its preparations, *i. e.* has been scoured, fulled, and shorn, (see **FULLING** and **SHEERING**,) it is folded square, in equal plaits; and a skin of vellum, or fine smooth pasteboard, is put between each plait. Over the whole is laid a square wooden plank; and in this condition it is put in the press, which is driven tight down by means of the screw turned full upon it, by the hands, assisted with levers.

After it has lain a sufficient time under the press, they take it out, remove the pasteboards or vellums, and lay it up to keep. It may be observed, that some do not use a press with a screw in pressing cold, but content themselves with laying the stuff on a firm table, after plaiting and pasteboarding it as before; covering the whole with a wooden plank, and loading this with a weight, greater or less, as is judged necessary.

PRESSING Hot, Method of. The stuff having received all its preparations, as before, it is sprinkled a little with water, sometimes with gum-water, spurted over it with the mouth; then plaited equally, and between each two plaits are put

leaves of pasteboard; and between every sixth and seventh plait, as well as over the whole, an iron or brass plate, well heated, in a kind of furnace prepared for the purpose.

This done, it is laid upon the press; and a screw is brought forcibly down upon it, by means of a long iron bar.

Under this press are laid five or six pieces, one over another, at the same time, all furnished with their pasteboard and iron plates. When the plates are well cold, they take the stuffs from under the press, remove the pasteboards and plates, and stitch it a little together, to keep it in the plaits.

This manner of pressing woollen stuffs is very pernicious, and was only invented by the manufacturers to cover the defects of the stuffs, and excuse their not giving them all the shearings, dyes, and preparations, that are necessary to render them perfect: accordingly they have been frequently prohibited.

PRESSING to Death. See **PAIN Fort & Dure**.

PRESSION, or **PRESSURE**, in the *Cartesian Philosophy*, an impulsive kind of motion, or rather an endeavour to move, impressed on a fluid medium, and propagated through it.

In such a pression the Cartesians suppose the action of light to consist. (See **LIGHT**.) And, in the various modifications of this pression, by the surfaces of bodies, on which that medium is thus pressed, they suppose the various colours to consist, &c. But sir Isaac Newton has taught us better; for if light, *e. gr.* consisted only in a pression, propagated without actual motion, it could not agitate and warm such bodies as reflect and refract it, as we actually find it does; and if it consisted in an instantaneous motion, or one propagated to all distances in an instant, as such pression supposes, there would be required an infinite force to produce that motion every moment, in every lucid particle.

And if light consisted either in pression, or in motion propagated in a fluid medium, whether instantaneously, or in time, it must follow, that it would infect itself *ad umbram*; for pression, or motion, in a fluid medium, cannot be propagated in right lines, beyond any obstacle which shall hinder any part of the motion; but will infect and diffuse itself, every way, into those parts of the quiescent medium which lie beyond the said obstacle.

Thus the force of gravity tends downward; but the pressure which arises from that force of gravity, tends every way with an equable force; and, with equal ease and force, is propagated in crooked lines as in straight. Waves on the surface of water, while they slide by the sides of any large obstacle, do infect, dilate, and diffuse themselves, by degrees, into the quiescent water lying beyond the obstacle. The waves, pulses, or vibrations of our air, in which sounds consist, do manifestly infect themselves, though not so much as the waves of water; for the sound of a bell, or of a cannon, can be heard over a hill, which intercepts the sonorous object from our sight; and sounds will be propagated as easily through crooked tubes, as through straight.

But light is never observed to go in curve lines, nor to infect itself *ad umbram*; for the fixed stars do immediately disappear on the interposition of any of the planets; as well as some parts of the sun's body, by the interposition of the Moon, Venus, or Mercury.

PRESSURE of the Air. See **AIR**.

Most of the effects anciently ascribed to the *fuga vacui*, are now accounted for from the weight and pressure of the air.

The pressure of the air on the surface of the earth is balanced

anced by a column of water of the same base, and about thirty-five feet high; or of one of mercury, of about twenty-nine inches.

The pressure of the air on every square inch on the surface of the earth, is computed to be about fifteen pounds avoirdupois. See *ATMOSPHERE*.

PRESSURE, Centre of. See *CENTER of Pressure*.

PRESSURE of Fluids. See *FLUID*.

PRESSURE Engine is an hydraulic machine, acting by the power of a descending column of water upon the piston of a cylinder, to give motion to pumps, for raising water from a different level. In the mountainous districts which so frequently contain rich mineral treasures, falls of water may be often obtained at a greater elevation than it is practicable to construct water-wheels of sufficient size to occupy the whole descent; and often the stream is too small to supply a wheel. In these situations the pressure engine is well adapted to produce the greatest effect from the fall, in working pumps, or other machines for draining the mines of water. The same principle can readily be extended to the raising of water for supplying towns, gentlemen's houses, &c.; and universally for raising water from any depth wherever a fall of water can be procured, particularly in those cases where the fall is great, that is, where it exceeds 30 or 40 feet. It will not only exceed all other known machines in effect, but in simplicity, and that whether the quantity of water that is to be applied is great or small.

Machines of this kind, invented by Mr. Denizart, are described in the *Machines Approuvées par l'Académie* for 1731, vol. v. and by Mr. Genflanes in 1741, vol. vii.; but the earliest which was put in execution in this country was by Mr. William Westgarth, who invented the proper expedients to obviate those difficulties which had before attended the practical execution of machines upon this principle in France; he erected a large one at a lead mine of Sir Walter Blacket's, at Coal Cleugh, in Northumberland, in the year 1765. Mr. Westgarth's machine consisted of a cylinder, provided with a piston suspended by a chain from a beam or working lever, from the opposite end of which the rod of the pump, which was to raise the water, was suspended; the working cylinder was made the full height of the column of water which was employed to work the engine, and the working beam was, of course, placed above the top of it, whilst the chain and rod reached down into it; so that the piston itself acted in a chamber or barrel, nearly at the bottom of it; a trough, or cistern, at the top of the cylinder, was kept constantly supplied by the stream of water, and thus the whole height of the cylinder being filled with water, the pressure of its column always bore upon the piston. From the lower part of the cylinder was a passage to permit the water to escape from it, and likewise another passage by a pipe, communicating from the lower part of the cylinder, beneath the piston, to the upper part of the same above the piston. Both these passages were governed by a sliding valve of very ingenious structure, which opened and shut them alternately, but would not allow both to be open at one time. The sliding valve was actuated by an apparatus of levers, very similar to those used in the old steam-engines for opening the cocks; and the pump rods were so loaded as always to have a preponderance to draw the piston up when the pressure of the water upon it was removed or balanced. Suppose the piston at the top of its motion, by opening the passage from the bottom of the cylinder the water escapes from it, and relieves the lower side of the piston from the pressure of the water, whilst the whole column continues to press upon the upper side: in this situation the piston descends, drawing up a column of water in the pumps

at the opposite end of the beam or lever, but on arriving at the bottom of the cylinder, the mechanism alters the sliding valve, and it closes the passage at which the water escapes from the cylinder, and at the same time opens the other in the pipe, which admitting the water from the upper into the lower part of the cylinder, it will press equally below the piston as above it, consequently the forces are balanced, and the counter-weight of the pump rods, at the opposite end of the beam, will draw up the piston to the top of its chamber, when the position of the sliding valve is again altered, and it closes the pipe, at the same time opening the passage for the water to escape; this makes another stroke, and thus the engine continues to work as long as the supply of water is kept up. The minutiae of the machine are described in the *Transactions of the Society of Arts*, vol. i. but the ingenious Mr. Smeaton soon improved it very materially, by enclosing the top of the cylinder with a lid, through which the piston rod passes in a collar of leather, and the cylinder is then required to be no higher than convenient for the motion of the piston within it, the water being introduced to it by a pipe. The construction of Mr. Westgarth's sliding valve he preserved with very little alteration. In *Plate Pressure*, we have given drawings of a small engine which Mr. Smeaton erected in Yorkshire, at the seat of lord Irwin, in 1770, to raise a supply of water for the service of the house. *Figs. 1 and 2* are elevations of the whole engine, and the other figures are enlarged sections of the sliding valve, which regulates the admission of the water into the working cylinder at proper intervals, to cause the motion.

The pipe, A, which supplies the engine with water is 1.7 of an inch bore; its perpendicular descent from its mouth or entry at the spring of supply is 54 feet; and its length 400 feet. The water is conveyed from the engine by a pipe, I, which has a fall or descent of twelve feet from the engine to the surface of the water in the pit or well into which it delivers; and it has a stop-cock, which regulates the discharge of the water. This descending column of 66 feet of water is employed in working a pump, D, which throws back part of the water to a reservoir by a pipe, O, in ascent about 900 feet in length, and 1.5 inch bore. The delivery of this pipe at the top of the reservoir is 80 feet above the engine, consequently 26 feet above the level of the head or spring of supply. The pipe, A, conducts the water to the pump, D, by one branch, and to the top of the cylinder, C, which works the engine, by the other. The cylinder, C, is of brass, truly bored, and furnished with a solid piston, whose rod, b, passes through a close stuffing-box in the cylinder lid, where a leather is packed round it so closely, that no water can leak by it; the upper end of the piston rod is keyed into a small box, which connects it with an iron rod, sliding through a guide, c, to make it move steadily. K is the working-beam, moving round a centre at L; it has an arch head at the outer end, which is a segment of a circle, struck from the centre L; the arch receives a chain, by which the piston-rod, b, is suspended, and therefore has a vertical motion. E is the pump-rod, jointed to the beam, and moving up and down with it; the forcer of the pump, D, is fixed to it at the lower end. H is a pipe, which forms a communication between the top and bottom of the cylinder; it leads down into a chest, N, upon which the cylinder is placed, and to which it is open at bottom; the chest is composed of plates screwed together, as shewn by the sections, *figs. 3, 4, and 5*, which also explain the construction of the sliding valve contained within the chest. In these figures, s is a short cylindrical pipe, fixed across within this chest, and communicating with the

pipe, H, at top, and the pipe I (which conveys the water away from the engine) at bottom. This short pipe has a water-tight division, *v*, (*fig. 4.*) in the middle of it, so that there is no direct passage through it from H to I; but there are four square holes made in the pipe, at equal distances round it, above and also below the division, as shewn at *figs. 4* and *5*. A cylinder or tube of brass, *t t*, is fitted upon the cylindric pipe, and slides up and down it, being packed with leather round the edges of the middle partition, as shewn in *fig. 4*, that no water may escape between the two cylinders. The sliding cylinder, *t*, is just half the length of the other, and when it is pushed down, as in the figures, it covers and stops the four holes in the pipe *s*, which are below the division *v*, and opens the four holes above the division, allowing a passage from the pipe H to the bottom of the cylinder C, *fig. 1*. On the contrary, when the slider is pushed up, the upper holes are closed, and the lower ones opened, making a passage from the cylinder bottom into I. The sliding valve *s*, besides the leather packing which surrounds the partition *v*, has leather placed at top and bottom of the fixed cylinder *s*, at *r, r*, and the ends of the slider are pressed upon these leathers, to make a tight joint when up or down, but the cylinder fits as tight as it can be made, independent of the leathers. The sliding valve has a pin projecting from each side of it, which pins are included between clefts made at the end of a forked lever *w x*, moveable on an axis *y*, which passes through the side of the chest in a collar of leather *z*, *fig. 5*, and has a long lever *o*, *figs. 1* and *2*, fastened upon it. By moving the upper end of this lever towards the engine, the sliding valve will be raised up; and by moving it in a contrary direction, the valve will be pushed down: *g* is a small iron rod, jointed to the upper end of the long lever by one of its ends, and the other is suspended by hooks from a spindle turning upon pivots, supported by the framing; this spindle has several levers upon it, similar to the working gear of a steam-engine, as follows: *b b e* is a three-armed lever; the arm, *e*, has a weight at the end, and is called the tumbling bob; *b* and *b* are two other arms, made in the same piece with *e*; these two latter arms strike against a pin, fixed across in the end of the rod *g*, which is forked, to admit the pin and the arms *b, b*, to act within the fork; *k* are two crooked levers, by which the spindle is moved as handles; these levers are struck by pins, *i*, fixed in a wooden rod *d d*, which is jointed to the working-beam K, and moves up and down with it: *e*, (*fig. 2.*) is a piece of wood fixed to the upright beams of the frame, having pins projecting from it, which catch the tumbling bob *e*, and prevent it moving too far; Q is a stop-cock in the main pipe, which regulates the quantity of water coming to the engine, and consequently the velocity with which the engine will work.

To describe the operation of the engine; suppose every thing to be in the position of the figures, and the pipes, cylinder, and pump, full of water, the sliding valve is down in the position of *fig. 4*, and therefore forms a communication from the top to the bottom of the cylinder: in this state the pressure of the descending column of fifty-four feet of water presses equally upon both sides of the piston of the cylinder, and therefore has no operation either way, the communication with the pipe I being stopped, so that the water cannot escape through it; but the pressure operates upon the lower surface of the forcer D of the pump, rising freely through the lower valve of the pump; this pressure, being unbalanced, raises up the working beam, and with it the piston of the cylinder and the rod *d*. This, as before mentioned, has pins, *i*, in it, one of which is seen, in *fig. 1*, to be just meeting the arm or handle *k*, which it raises, lifting

the tumbling bob *e*, and turning the axis with all its levers. When the engine arrives at the top of the stroke, the tumbling bob passes the vertical point, and falls over on the other side of the centre; the arm *b* now strikes the cross pin in the end of the rod *g*, and by drawing it moves the lever *o*, and lifts up the sliding valve; this closes the communication between the top and bottom of the cylinder, and opens a passage to the pipe I, permitting the water to pass through the pipe into the well, and thus get away from the engine. This removes the pressure of fifty-four feet from beneath the piston, though it still remains acting at the top of the piston, and has added to it the twelve feet from the engine to the bottom of the well, in consequence of this column being suspended in the pipe I; this unbalanced pressure causes the piston to descend, bringing down the end of the beam K, and pump rod E with it: the valve in the bottom of the pump now shuts, and the water in the pump, being pressed by the forcer, opens the other valve at M, and goes up the pipe, *o*, to the reservoir, lifting a column of water of eighty feet. When the engine gets to the middle of its stroke, a pin in the other side of the wooden rod *d*, and therefore not seen, takes the lever, *k*, and forces it down, raising the tumbling bob, *e*, at the same time. By the time the piston arrives at the bottom of the cylinder, the tumbling bob is brought past the vertical position, and suddenly oversets, by its own weight, into the position of *fig. 1*. The lever, *b*, now runs against the pin, across the end of the rod *g*, and shoves it from the engine, moving the long lever, *o*, of the sliding valve, and the short lever, *w x*, (*fig. 3.*) down, just in the position of the drawings. This closes the four lower holes in the fixed cylinder, and prevents the water going down the pipe I, but at the same instant opens the four upper holes, forming a communication between the top and bottom of the cylinder. The pressure of sixty-six feet, which caused the piston to descend, is now removed, or rather balanced, by causing it to act equal beneath the piston; and the column of water of fifty-four feet, coming down the pipe A, and through the branch, forces open the lower valve of the pump, (the valve at M closing and supporting the column of eighty feet,) presses the under side of the pump forcer, and raises it up, as before described, moving the beam and piston with it; there now being an equal pressure, both above and below the piston, it will be moved up easily. When the piston arrives at the middle of its stroke, the preceding operations are repeated; thus the pin in the rod, *d*, takes the lever *k*, and raises it till it arrives at the top of its stroke, when it again passes the vertical position, and instantly falls over into the position first described; the lever *b*, taking the end of the rod *g*, and pushing it towards the engine, raises the sliding valve, opens the passage to the pipe I, and the whole column of sixty-six feet now presses upon the piston, and forces it down as before described, overcoming a column of eighty feet upon the pump. Though the diameter of the pump is larger than that of the cylinder, this happens from the chain of the piston acting upon a much longer lever than the pump. P and N are two air-vessels upon the pipes A and *o*, to equalize the action of the pump, and to prevent the shock which would otherwise take place when the sliding valve was suddenly shut, and the motion of the descending water thus checked.

A very complete pressure engine was erected by Mr. Trevathick at the Druid copper-mine, in Illogan, near Truro, in Cornwall; it acted with a double power, that is, the pressure was first applied to one side of the piston to force it up, and then on the other to force it down, in the same manner as a double acting steam-engine. It acted by two sliding valves instead of one, but they were so made that one

opened rather before the other shut, and this, though it walted a small quantity of water, by permitting it to escape, prevented the concussion of stopping the column of water, which indeed is always in motion.

PREST, a duty in money, paid by the sheriff upon his accounts in the exchequer, for money left, or remaining, in his hands.

The word is French, *prest*; where it signifies *ready*.

PREST-Money is a sum of money which binds those who receive to be ready at command, at all times appointed; chiefly understood in the listing of soldiers.

PREST-Sail, in *Sea Language*, is when a ship carries all the sail she can possibly crowd.

This is sometimes done in giving chase, &c. but it is a dangerous experiment, lest the ship overfet, or bring her masts by the board; in which latter case she becomes an easy prey.

PRESTANT, the name of a metal stop in French organs, equal to the *principal* in our's: being an octave above the open diapason, and an octave below the fifteenth.

PRESTATION-MONEY, a sum of money paid yearly, by archdeacons, and other dignitaries, to their bishop, *pro exteriori jurisdictione*.

PRESTATION, *Præstatio*, was also anciently used for other payments; "Et quieti sint de præstatione muragii." Chart. Hen. VII. Sometimes also for pourveyance.

PRESTEAN, in *Geography*, a town of the Morea, in the gulf of Coron; 11 miles S.S.E. of Scardamula.

PRESTEIGNE, or LLAN-ANDRAS, a borough and market town in the cwmwd of Dyffryn Teyfecliad, Cantref-y-Clawdd, (now called the hundred of Radnor,) in the county of Radnor, South Wales. It is situated near the south bank of the river Lug, on the confines of the county with Herefordshire, and in the centre of a fertile and well cultivated valley. This town is of considerable antiquity, and is a borough by prescription, but has now lost the privilege, which it formerly enjoyed, of voting as a contributory borough, in the election of a representative to parliament. It still, however, exercises other important rights, and is governed by a bailiff, nominated by the steward of the cantref of Maelienydd, an officer in the appointment of the crown. Richard Martine, the pope's legate in the reign of Richard III., was an extraordinary benefactor to Presteigne, having obtained for the inhabitants many privileges, and among others those of holding a weekly market on Saturday, and fairs three times a year, in May, June, and December, which are continued to this day. The church here is very ancient, and over the great chancel window are sculptured the initials P. L. M. and the date 1244; but the meaning of the letters is unknown. In this church are several old monuments, inscribed with the names of Owen, Price, and Davies; and the walls are adorned with various texts from the scriptures, and with figures of Moses and Aaron, Time and Death. Here is a free-school, founded, and liberally endowed, by John Beddoes, esq. in the reign of queen Elizabeth, for the benefit of the inhabitants of the township. The great and quarter sessions are held in this town, and the county courts alternately here and at Radnor. Presteigne is now considered the principal town in the county; and seems to be improving both in respectability and population. According to the parliamentary returns of 1811, it contained 239 houses and 1114 inhabitants.

On a little eminence adjoining the town, called the Warden Walks, formerly stood the castle of Presteigne, of which not a trace remains, nor are any notices of its history recorded. Its site is now occupied by a pavilion, and by a bowling green, presented to the inhabitants by lord Ox-

ford, the present steward of the cantref of Maelienydd. A place in this vicinity, called the "King's Turning," still commemorates, (as does the parish register,) the residence of king Charles here for two nights, in his flight to Chester from the pursuit of Oliver Cromwell.

On the summit of a lofty hill, about four miles to the S.E. of the town, is Weobly encampment, which is generally attributed to the Romans; but as that people seldom fixed their camps on the summits of mountains, we rather incline to attribute it to the Britons, after they were driven into Wales, by the Saxons. It is of an oval form, with one vallum on the N. side, where the ground is precipitous, five on the N.E. side, and four on the N.W. and S. sides. There are several openings into the area; but there seems to have been only one original entrance, and that from the S. Near it is a large reservoir, fifteen feet deep, which is constantly supplied with water. At the foot of the hill is Kinsham Court, the seat of the countess dowager of Oxford. The Cambrian Traveller's Guide, 8vo. 1813. Carlisle's Topographical Dictionary of Wales.

PRESTENO, a town of Italy, in the department of the Adda and Oglio; 4 miles S. of Breno.

PRESTER, a meteor, consisting of an exhalation thrown from the clouds downwards with such violence, as that by the collision it is set on fire.

The word is Greek, *πρηστηρ*, the name of a kind of serpent; called also *dipsas*, to which this meteor is supposed to bear a resemblance.

The prester differs from the thunderbolt in the manner of its inflammation; and in its burning and breaking every thing it touches with greater violence. See *Water-SPOUT*.

PRESTER, a word used by some to express the external part of the neck, which is usually inflated in anger.

PRESTER John, or Jean, an appellation given to the emperor of the Abyssinians; because, anciently, the princes of this country were really priests; and the word *jean*, in their language, signifies *king*.

He was first made known in Europe under this title by the French. His empire was, anciently, of vast extent; but afterwards it was confined to six kingdoms, each about the size of Portugal.

The name Prester John is altogether unknown in Ethiopia; and took its rise hence, that the people of a province where this prince usually resides, when they request any thing, say *Jean-coi*, i. e. *my king*. His proper title is, the *Grand Negus*.

There is also a Prester John of Asia, mentioned by M. Polo the Venetian. His jurisdiction is in the country of Cangingu, between China, Sifan, and Thibet; a kingdom mightily valued by the Chinese for its policy, and the number of its fortified cities; though they have usually the utmost contempt for foreign countries.

Some say this latter is so called from a Nestorian priest, or presbyter, mentioned by Albericus, towards the year 1145, to have mounted the throne; who having been a presbyter before his elevation to the royal dignity, was called Presbyter John, or Prester John, even when he was seated on the throne; but his kingly name was Ungehan. This presbyter availing himself of the death of Coireinchan, otherwise called Kenchan, the monarch of Asiatic Tartary, which borders upon Cathay, invaded the kingdom with such vigour and success, that he was acknowledged as its monarch. Others say, that he takes the name from a cross which he bears in his hand as a symbol of his religion.

The history of Prester John has been involved in considerable obscurity and confusion. Some have apprehended

that there were two persons in the East under this appellation, agreeably to the preceding account; whilst others consider the Abyssinian Prester John as a fictitious character. The fact, as Mr. Mosheim has stated it, seems to be briefly this. In the fifteenth century, John II. king of Portugal, employed Pedro Covilliano in a laborious enquiry into the real situation of the kingdom of Prester John. The curious voyager undertook this task; and for information in the matter, travelled with a few companions into Abyssinia; and observing in the emperor of the Abyssinians or Ethiopians many circumstances that resembled the accounts which at that time prevailed in Europe concerning Prester John, he persuaded himself that he had fulfilled his commission, and found out the residence of that extraordinary monarch, who was the object of his researches. His opinion easily gained credit in Europe, which had not yet emerged out of its ignorance and barbarism. But a new light was cast upon this matter in the 17th century, by the publication of several pieces, which the industry of the curious drew forth from their obscurity, and by which a great number of learned men were engaged to abandon the Portuguese opinion, and were convinced that Prester John reigned in Asia, though they still continued to dispute about the situation of his kingdom, and other particular circumstances. There are, however, some men of the most eminent learning in our times, who maintain, that John was emperor of the Abyssinians, and thus prefer the Portuguese opinion, though (says Mosheim) destitute of authentic proofs and testimonies, to the other, though supported by the strongest evidence, and the most unquestionable authorities. Mosh. Eccl. Hist. vol. ii. 8vo. Eng. edit.

We shall only add, that the death of Prester John, and the total defeat of his successor by Genghizkan, or Gengiskhan, emperor of the Tartars, gave an unhappy turn to the affairs of the Christians in the northern parts of Asia, towards the close of the 12th century. From this period the Christian cause lost much of its authority and credit in the provinces that had been ruled by Prester John and his successor David, and continued to decline, till, at length, it sunk entirely under the weight of oppression; and was succeeded in some places by the errors of Mahomet, and in others by the superstitious of paganism. In this general account, however, we may except the kingdom of Tangut, the chief residence of Prester John, in which his posterity, who persevered in the profession of Christianity, maintained, for a long time, a certain sort of tributary dominion, which exhibited, indeed, but a faint shadow of their former grandeur. See NESTORIANS.

The fame of *Prester*, or *Presbyter* John, (says Mr. Gibbon,) a khan, whose power was vainly magnified by the Nestorian missionaries, and who is said at this time to have received the rites of baptism, and even of ordination, has long amused the credulity of Europe. In its long progress to Mosul, Jerusalem, Rome, &c. the story of Prester John evaporated in a monstrous fable, of which some features have been borrowed from the Lama of Thibet, and were ignorantly transferred by the Portuguese to the emperor of Abyssinia. Yet it is probable that in the 11th and 12th centuries Nestorian Christianity was professed in the hord of the Keraites. The royal convert, as the story says, was indulged in the use of a portable altar; but he dispatched an ambassador to the patriarch, to inquire how, in the season of Lent, he should abstain from animal food, and how he might celebrate the Eucharist in a desert that produced neither corn nor wine. In their progress by sea and land, the Nestorians entered China by the port of Canton, and the northern residence of Sigan. Unlike the senators of

Rome, who assumed with a simile the characters of priests and augurs, the Mandarins, who affect in public the reason of philosophers, are devoted in private to every mode of popular superstition. They cherished and they confounded the gods of Palestine and of India; but the propagation of Christianity awakened the jealousy of the state, and after a short vicissitude of favour and persecution, the foreign sect expired in ignorance and oblivion. Under the reign of the caliphs, the Nestorian church was diffused from China to Jerusalem and Cyprus; and their numbers, with those of the Jacobites, were computed to surpass the Greek and Latin communions. Twenty-five metropolitans or archbishops composed their hierarchy, but several of these were dispensed, by the distance and danger of the war, from the duty of personal attendance, on the easy condition that every six years they should testify their faith and obedience to the *Catholic* or patriarch of Babylon, a vague appellation, which has been successively applied to the royal seats of Seleucia, Ctesiphon, and Bagdad. These remote branches are long since withered, and the old patriarchal trunk is now divided by the *Elijahs* of Mosul, the representatives, almost in lineal descent, of the genuine and primitive succession, the *Josephs* of Amida, who are reconciled to the church of Rome, and the *Simeons* of Van or Ormia, whose revolt, at the head of 40,000 families, was promoted in the 16th century by the Sophists of Persia. The number of 300,000 is allowed for the whole body of the Nestorians, who, under the name of Chaldæans or Assyrians, are confounded with the most learned, or the most powerful nation of eastern antiquity. Gibbon's Hist. vol. viii.

PRESTESSE, in the *Manege*, is used to denote the readiness and diligence of a horse in working a manège.

PRESTET, JOHN, in *Biography*, a French priest and able mathematician, was born, in the year 1648, at Chalons-sur-Saône, where his father filled the humble post of tipstaff to the bailiwick. Being sent when young to Paris, in search of employment, he was taken into the service of the celebrated father Malebranche, who took upon himself the task of teaching him the mathematics. The pupil did credit to the master's expectations, and in 1675 he became himself an author, and published the first edition of his "Elements of the Mathematics," in one volume 4to. This was the first work of the kind which had appeared in France, and was particularly recommended by the number of curious problems which it contained, for exercising the ingenuity of young mathematicians. In the same year the author was admitted a member of the congregation of the Oratory, and he afterwards filled the mathematical chair in different seminaries belonging to the society, with great success and reputation. In 1689 he published at Paris the second edition of his "Elements," improved and enlarged. He died in 1690. Moreri.

PRESTEWITZ, in *Geography*, a town of Saxony; 3 miles N.E. of Liebenwerda.

PRESTIMA, a town of Portugal, in the province of Beira; 11 miles N. of Coimbra.

PRESTIMONY, PRÆSTIMONIA, in the *Canon Law*, a term about which authors are much divided. It is derived a *præstatione quotidiana*; and is, by some, defined a kind of benefice, served by a single priest: in which sense, prestimony is the same with a presbyterian chapel.

Others will have prestimony to be the incumbency of a chapel, without any title, or collation; such as are most of those in castles, where prayers or masses are said; and which are mere oratories unendowed. Whence, also, the term is applied, in the Romish church, to certain perpetual offices, bestowed

bestowed on canons, religious, or others, for the saying of masses, by way of augmentation of their livings.

Others, again, will have prestimony to be a lease, or concession of any ecclesiastical fund, or revenue, belonging to a monastery, to be enjoyed during life.

Du Moulin makes prestimony a profane benefice, which, however, has a perpetual title, and an ecclesiastical office, with certain revenues attached to it; which the incumbent is allowed to sell, and which may be possessed without tonsure: such as the lay-churchwardens of Nôtre Dame. He adds, that, in propriety, the canonries of chapels are benefices of this nature.

Upon the whole, the most probable opinion seems to be this, that prestimony is a fund or revenue appropriated by the founder for the subsistence of a priest, without being erected into any title or benefice, chapel, prebend, or priory; and which is not subject, either to the pope, or to the ordinary; but of which the patron, and those who have a right from him, are the collators, and nominate and confer, *pleno jure*.

PRESTISSIMO, in the *Italian Music*, intimates to perform extremely quick, hastily, and with fury.

PRESTO, Ital. quick. This term written at the beginning of a movement in music, implies the most rapid and animated measure of all the five different degrees of quickness; and this rapidity admits of increase by *più presto*, and *prestissimo*.

PRESTON, in *Geography*, a borough, market-town, and parish, in the hundred of Amounderness, and county-palatine of Lancaster, England. The town is placed upon an eminence ascending from the river Ribble, at the distance of 22 miles S. by E. from Lancaster, and 216 N.W. by N. from London. It is of great antiquity, having risen, according to Camden, out of the ruins of Ribchester, or Coccium, a Roman station, which was situated some miles higher up the river; but this opinion is only conjectural. It is probable, however, that it was a town of some importance previous to the Norman conquest; and it is said to have derived its name from the number of religious houses it contained during the period of the Saxon dynasty. From Domesday-book the lordship of this place appears to have been held by earl Tofti, brother to king Harold, who lost his crown and life at the celebrated battle of Hattings.

Preston was first incorporated, by charter, in the reign of Henry II.; and that charter has since been confirmed and extended by several of his successors. Under that last granted, the corporation now consists of a mayor, a recorder, eight aldermen, four under aldermen, seventeen common-councilmen, and a town clerk; and it has the peculiar privilege of holding a guild every twenty years, which is resorted to as a kind of jubilee by the people of fashion and leisure from all the country round. It is held in August, and lasts a month. On the day it begins, the members of the corporation walk in procession, followed by the trading companies, under their respective banners, and decorated with the insignia of their professions. Plays, concerts, and other public amusements enliven this period of festivity and joy. The last jubilee took place in 1802, being the third which has occurred since the commencement of the reign of his present majesty. This curious custom originated in Saxon times, and is strictly enjoined in all the charters to the corporation, on pain of forfeiting the elective franchise, and their rights as burgesses. Every person, on this occasion, must renew his freedom within twenty-eight days after proclamation is made, or be liable to lose the same for ever.

This town returns two representatives to the national councils. It first enjoyed that privilege in the reign of Ed-

ward I.; but after the first year of his successor, it ceased sending until the reign of Edward VI., since whose reign its returns have been regular. Party contests have, perhaps, been as violent here as in any borough in England; indeed, on the occasion of several elections Preston has almost suffered the fate of a town stormed by an enemy. A question has been at issue for nearly a century and a half, whether the right of election vested generally in the inhabitants, pot-wallahs, or was confined to "the in-burgesses of the last guild, and those admitted since by copy of court-roll?" This point has been four times discussed in the house of commons, and each time the decision has been in favour of the inhabitants at large. The chief influence in the borough is that of the earl of Derby, who commonly returns one member, and the dissenting interest the other. The mayor and two bailiffs are the returning officers, and the voters are estimated at 600 in number.

Preston, though free, comparatively, from the bustle of trade and manufacture, is nevertheless opulent and well inhabited; and takes the lead of all the towns in Lancashire, in point of gentility and fashionable resort. It has moreover the advantage of being the seat of several law courts, *viz.* the borough court; a court of chancery for the duchy of Lancaster; a county court, which sits on Tuesday weekly; a court called the county arrest; and a fifth for the wapentake; besides the court of quarter sessions, which is held here by adjournment from Lancaster on the Thursday of the week after Epiphany. Hence, as may be supposed, a large proportion of the inhabitants of Preston are engaged in, or connected with, the profession of the law. Markets are held here on Wednesday, Friday, and Saturday, every week, and are extremely well regulated to prevent forestalling and regrating. Here are likewise three annual fairs, in March, September, and January. Coals are supplied plentifully by means of the Douglafs and Lancaster canals, the former of which communicates with the river Ribble, and the latter passes close to the town. By these canals communications are opened with all the principal rivers in the kingdom.

From its lofty situation, and its proximity to the Irish sea, Preston enjoys a salubrious and healthful climate. It is a handsome, well-built town, with broad, regular streets, and many good houses; and is rendered gay by assemblies and other places of amusement, suitable to the genteel style of the inhabitants. The earl of Derby has a large modern mansion in it. The principal public buildings are, the parish church, the town-hall, the assembly rooms, the new prison, and the bridge. The church is a very spacious structure, the living of which was formerly appropriated to the college of Leicester, but is now in the patronage of the Hoghton family. There are also several chapels of ease, and meeting-houses for different sects of dissenters, but Sectarians are comparatively few in number. The town-hall is a very substantial and commodious building, and contains a fine portrait of George II., presented to the corporation by sir Edward Stanley. The assembly rooms, which are well adapted to their object, were erected at the expence of the earl of Derby. The new prison, or penitentiary house, is situated near the entrance to the town from Chorley, by Walton. It was built at the charge of the hundreds of Lonsdale, Amounderness, Blackburn, and West-Derby, on the Howardian plan, and is exclusively appropriated to prisoners from those hundreds. Its object is salutary confinement and reformation only; each prisoner has a daily allowance of one pound and a half of bread, with a proportionate quantity of butter, and a few potatoes; and they are permitted to exchange what they do not eat for tea and sugar; but

but all strong liquors are strictly prohibited. The new bridge was built over the Ribble in 1781, in the place of a former one carried away by a flood.

From its relative position Preston has been an important post in the civil commotions of the kingdom, and the scene of various military actions. In the time of the parliamentary resistance to Charles I., the royal army, under the duke of Hamilton and sir Marmaduke Langdale, was defeated here with great slaughter by an inferior force commanded by generals Cromwell and Lambert. Here also the rebel general Forster was routed by the king's troops in 1715; when many persons in Preston suffered for taking up arms in the cause of the Pretender. In 1745 prince Charles took possession of this town; and is said to have viewed the country around from the Enim walk with extraordinary emotions.

The borough of Preston, according to the parliamentary returns of 1811, contains 3624 houses and 17,065 inhabitants. The religious houses recorded to have been founded here since the conquest, are, an hospital, established soon after that event, and a house of Grey friars, erected and endowed by Edmund, earl of Lancaster, son to Henry III.; but of neither of them do any vestiges remain. About a mile from the town, at Penwortham, was likewise a priory of Benedictine monks, subject to the abbey of Evesham, in Worcestershire. It was founded about the year 1068 by Warine Ruffel; and at the dissolution was granted by king Henry VIII. to John Fleetwood.

From Preston a Roman causeway, or military road, still distinctly visible in places, conducts to Ribchester, once a military station of that people. Its original designation has been a matter of much contention among antiquaries. Camden supposes it to have been the Coccium of Antoninus, and the Rigodunum of Ptolemy. Horsley was of the same opinion as to Coccium, but inclined to fix Rigodunum at Warrington. Mr. Whitaker, the historian of Manchester, contended that it was Rerigonium of Richard of Cirencester; but Dr. Whitaker, who last investigated the subject, appears to have clearly identified it with Coccium. This antiquary assigns its original establishment to Agricola, and says it was placed with the peculiar judgment which distinguishes the encampments and works of that celebrated commander. From the boldness and extent of its ramparts, and also from the number of altars, inscribed stones, earthen vessels, plates of copper, coins, and other relics found here, Ribchester is presumed to have been a station of more than ordinary magnitude and importance. That the Ribble was anciently navigable as high as this place, is proved by the fact of many anchors having been dug up in the vicinity, as well as the hull of a ship, larger than could now be floated above Preston. Contiguous to Ribchester is the parochial chapel of Stede, which originally belonged to a guild or hospital. See Beauties of England and Wales, vol. ix. by John Britton, F.S.A. A Description of the Country from 30 to 40 Miles round Manchester, by John Aikin, M.D., 1795. History, &c. of Whalley, by the Rev. Dr. Whitaker.

PRESTON, a town of America, in New London county, Connecticut, six or eight miles E. of Norwich, from which it is divided by Shetucket river; incorporated in 1687, and containing two congregational churches, a society of Separatists, and 3284 inhabitants.—Also, a village of Kentucky, on the bank of the Ohio, just below the salt-works.

PRESTON'S Creek, or Wood Creek, a river of Kentucky, which runs into the Ohio, N. lat. 37° 54'. W. long. 86° 46'.

PRESTONIA, in Botany, received that appellation from Mr. R. Brown, in memory of Dr. Charles Preston,

resident in Scotland in the time of Ray, and a correspondent much esteemed by that great naturalist, in whose *Methodus emendata* many of his observations are preserved. Brown Apoc. 58. Class and order, *Pentandria Monogynia*. Nat. Ord. *Contortæ*, Linn. *Apocineæ*, Brown.

Eff. Ch. Corolla falver-shaped; its mouth crowned with an annular undivided tube, and five internal scales, alternate with the segments of the limb. Anthers half-prominent, arrow-shaped, cohering with the middle of the stigma, their hind-lobes empty. Germens two. Style one, thread-shaped, dilated at the top. Stigma turbinate, with a small taper point. Nectary a cup of one leaf below the germen. Follicles

1. *P. tomentosa*. Downy Prestonia. Gathered by sir Joseph Banks, in hedges near Rio de Janeiro in the Brazils. A twining downy shrub. Leaves opposite, downy. Corymbs dense, between the footstalks. Calyx leafy, its segments furnished with a small scale, internally, at their base.

PRESTON-PANS, in Geography, a burgh of barony, market, and sea-port town, in the county of Haddington, or East Lothian, Scotland, is situated on the southern bank of the Frith of Forth, at the distance of eight miles E. from Edinburgh. This place derived its name from the small village of Preston adjoining, and from the salt-works or pans established here by the monks of Newbottle as early as the year 1189. For several centuries it was called *Salt-Preston*; but in 1617, when the charter for erecting it into a burgh of barony was granted, it had obtained its present appellation. Previous to the union a very considerable foreign trade was carried on here, especially in Dutch and French goods; and even so late as 1719, forty-one foreign cargoes were delivered at this port within twelve months, nineteen of them from vessels belonging to the town. The harbour chiefly used at that period was Port-seaton, about a mile to the east, in the parish of Tranent; that belonging to the town at present is Morison's Haven, which is situated at its western extremity. It was formerly called New Haven, and sometimes Acheson's Haven, from an ancient family of that name, progenitors of the earl of Gosport, in Ireland. This harbour draws twelve feet of water, and is considered one of the safest on the Frith of Forth. A custom-house is established here, the jurisdiction of which extends from the Figgat-Burn, in Mid Lothian, on the west, to the mouth of the East Lothian Tyne, on the east. Within the collection are thirty-one salt-pans: viz. eleven at Cockenzie, four at Preston-Pans, two at Cuttle, four at West-Pans, four at Pinkie-Pans, and six at Duddington-Pans. The chief imports to this town are the ingredients for the manufactures carried on in it, and in the vicinity; the exports are fish, particularly oysters, stone-ware, bricks, tiles, oil of vitriol, spirit of salt, and Glauber salts. About twelve thousand bushels of salt are made here annually. The stone-ware is manufactured partly from the fine clays in the neighbourhood, and partly from clays brought from Devonshire. The white and red lead used in the glazing process is imported from London, Hull, and Newcastle. This branch of business was established here about a century and a half ago; and was probably first derived from the Dutch. How long the smaller manufactories have existed is not recorded. Here is a market twice a-week, on Wednesday and Saturday, chiefly for butcher's meat and other provisions. In 1754, there were in this town no fewer than sixteen brewers, but they are now reduced to a third of that number; two or three of those remaining, however, brew upon a very extensive scale. According to the parliamentary returns of 1811, the parish contains 299 houses, and 1995 inhabitants.

A very singular commercial institution is connected with this town. On the second Tuesday of July, annually, the travelling chapmen, or pedlars, that is, the itinerant sellers of wares, &c. of the three Lothians, meet here and elect some of their number for the purpose of holding courts to enforce the observance of bye-laws, to which they bind themselves to give obedience at their admission into the society. They elect on this occasion a provost, or preses, a deputy-provost, a clerk, a treasurer, six bailies, and several counsellors. There is one bailie for Preston-Pans and Cockenzie; one for Haddington and North-Berwick; one for Dunbar and Oldhamstocks; one for Musselburgh and Dalkeith; one for Queensferry and Borrowstowness, and one for Linlithgow and Bathgate. After the election they march in a body, preceded by music, to the cross at Preston, where they drink a few bottles of wine, and then return. In the towns where their booths are erected at fairs, the bailie for that town gets a pledge from each chapman, who is bound to attend a meeting of the whole number at an appointed hour in the evening, or the next morning. Here the behaviour of each during the fair is enquired into. If any of the bye-laws have been transgressed, a fine is exacted and paid. If the offence has been gross, they are expelled. The fines are deposited in the hands of the treasurer, and are applied to relieve the widows or families of those members of the society who need supply, and sometimes of such of their number as have been unsuccessful in business. They cannot proceed to an election unless some married member be present; but the preses is usually chosen from among the unmarried men, it being supposed that bachelors will more readily attend the fairs. When a new member is admitted, he pays a sum to the common fund. No information has been obtained, that can be depended upon, as to the origin of this society, or the circumstances that led to the holding of their annual meetings at Preston, which was the case before its fairs were transferred to Preston-Pans. This village and parish is situated to the south of that town, comprehending Northfield and Schaw's-hospital. It is of greater antiquity than Preston-Pans, which indeed was formerly comprehended within the parish of Preston, though now a distinct parish in itself. Schaw's-hospital was originally a family residence, but was converted to its present purpose by the will of the late James Schaw, esq., who died in 1784, and now affords maintenance and education to twenty-four boys. The funds appropriated to the support of this establishment consist of the barony and a great part of the lands of Preston. Here are the ruins of a tower, which formerly constituted part of the family mansion of the Hamiltons of Preston; and here is likewise a market cross, but so much has Preston decayed, that this relic of its former importance is now situated in a field. It is the property of the pedlars, they having acquired a right to it in the year 1636.

In the open grounds above the village of Preston, was fought, on the 22d of September, A.D. 1745, the "battle of Preston-Pans," in which prince Charles Stewart, commonly called "the Young Chevalier," at the head of his Highland army, completely routed the English forces under the command of general sir John Cope; all the infantry, except about 170, being either killed or taken prisoners. In this action the brave colonel Gardner, disdaining inglorious flight, fell on the field of battle, as did likewise captain Brymer, of Lee's regiment, who was the only officer present who had ever seen Highlanders engaged with regular troops, and expressed strong apprehensions of the result on the day previous to the battle.

Preston, with Preston-Grange, which is situated within

the parish of Preston-Pans, was erected into a burgh of barony in the year 1617; and is now distinguished by the name of the West Barony. The adjunct grange to the latter place was derived from the grange which the monks of Newbattle settled here. The earl of Hyndford is principal proprietor of the grange lands, and has a seat in the vicinity.

About a mile from Preston-Pans is the village of Tranent, which contains about 1500 inhabitants, and is chiefly remarkable on account of its church, which has the appearance of being "a practical or architectural pun" upon the mysterious doctrine of the Trinity, to the honour of which it is dedicated. It is a building of very high antiquity, but nothing is known of its foundation or history. On the outside it appears to consist of three separate oblong houses, placed parallel to each other; but when entered it is found to constitute only one building. The central portion is somewhat longer at each end than the others, with which it communicates by means of openings in its side-walls, formed by lofty circular arches. The roofs of all the divisions are vaulted and covered with stone, and in the centre of the entire building rises a low, square tower. The windows of this edifice are few and small, and are scarcely adequate to afford a dismal light to the interior. Beauties of Scotland, vol. i. by Robert Forsyth, 1801. Carlisle's Topographical Dictionary of Scotland, 4to. 1813.

PRESTONVILLE, a town of America, in Floyer county, Kentucky, containing 32 inhabitants; its county contains 3453.

PRESTWICK, a town of Scotland, in the county of Ayr, which is a burgh of barony, and has a market weekly; three miles N.E. of Ayr.

PRESUMPTION, PRÆSUMPTIO, in *Law*, a suspicion, or conjecture, founded on a verisimilitude.

Presumption is of three sorts. 1. *Violent*, which many times is allowed a full proof; as if one be killed in a house, and a man is seen to come out of the house with a bloody sword, and no other person was at that time in the house; this, though but a presumption, is a proof. 2. *Probable*, arising from such circumstances as usually attend the fact, which has its due weight. 3. *Light*, or *temerarious*, which is of no prevalency at all.

In cases of a charter, or feoffment, if all the witnesses to the deed be dead, the violent presumption, that stands for a proof, gives continual and quiet possession. "Stabit præsumptio, donec probetur in contrarium." Coke on Litt. See CIRCUMSTANTIAL Evidence, and EVIDENCE.

PRESUMPTION was also anciently used for intrusion.

PRESUMPTION, *Præsumptio*, in *Rhetoric*, the same with prolepsis.

PRESUMPTIVE HEIR. See HEIR.

PRESUMPTIVE Evidence of Felony. See EVIDENCE.

PRESURA, in *Surgery*, inflammation of the ends of the fingers from cold; the phlogosis erythema of Cullen.

PRETENCE, in *Heraldry*. See INESCUTCHEON, and ESCUTCHEON of Pretence.

PRETENSED, or PRETENDED *Right*, in *Law*, is where one is in possession of lands and tenements, which another, who is out, claims and sues for. Here the pretended right is in him who so claims, or sues. As to the offence of selling such title, see CHAMPARTY.

PRETER, or PRETERIT, *præteritus*, *paß*, in *Grammar*, an inflexion of verbs, expressing the tense, or time passed.

Preter, or preterit, is a general name, that comprehends all the inflexions corresponding to the several tenses, or several circumstances and relations of the time past; all which, the Latins, &c. distinguish by particular inflexions,

or terminations, of the verb; which make the proper notion of tenses. See TENSE.

The modern languages, particularly the English, in lieu of different terminations of the verbs themselves, have usually recourse to those of their auxiliaries, and participles.

The preter, or past time, is subdivided, by grammarians, into "preterimperfect;" as *e. gr.* *I had, I thought*; in the Latin, *habebam, cogitabam*; in the French, *j'avois, je pensois*: the "preterperfect," as, *I have had, I have thought*; *habui, cogitavi*; *j'ai eu, j'ai pensé*; and "preterpluperfect," as, *I had thought, I had had*; *habueram, cogitaveram*; *j'eus eu, j'eus pensé*. The English have properly but two cases, or kinds, of the preter tense; *viz.* the preter time of the imperfect action; as, *I was at supper then*, but had not yet done it; and the preter time of the perfect action; as, *I had then supped*, and it was then done. The preter tense is ofteneft formed of the present tense, by adding *ed*; as *I burned*.

The French have a particular case of the preterperfect; which F. Buffier calls the preterite simple, in opposition to the former, called the preterit-composite; others call it the preterit-indefinite, because expressing a thing done indeterminate; as *j'écrivis hier*. This answers to the aoristus of the Greeks; and, in the distinction of this from the common preterit, does one of the greatest niceties in the practice of the French language consist.

In the passive voice, the Latins, French, &c. have recourse to participles and auxiliaries, like the English, to form their preter tenses; as, *I was loved, amatus eram, j'étois aimé, &c.*

PRETERIT, PRÆTERITUS, in the *Roman Jurisprudence*. *Infans præteritus*, is a child of whom the father has forgot to make mention in his testament; which renders it entirely null.

Exheredation of his son is allowed in a father, but never preterition.

PRETERITION, or PRETERMISSION, in *Rhetoric*, a figure whereby, in pretending to pass over a thing untouched, we make a summary mention of it.

I will not say he is valiant, he is learned, he is just, &c.

The most artful praises are those given by way of preterition. See RETICENCY.

PRETERNATURAL RAINS. See RAIN.

PRETEXT, or PRETENCE, a colour, motive, or cause, either real, or apparent.

PRETEXTA, or PRÆTEXTA, among the Romans, was a long white gown, or toga, having a band, or border, of purple, at the bottom.

It was worn by children of quality till the age of puberty, *i. e.* by boys till seventeen, at which time they laid it aside, and resumed the virile gown. Girls wore it till marriage.

It took its name prætexta, according to Godwyn, "quod ei purpura prætexta erat," because guarded about with purple silk.

The pretexta, at first, was a robe of state, or ceremony, worn only by the chief magistrates, and the priests, nor was it lawful for such who wore this gown to be arraigned, or sentence to pass against them, till it was pulled off. In continuance of time, it was permitted to noblemen's children; and at length, even to all Roman children in general. See TOGA.

PRETI, GIROLAMO, in *Biography*, an Italian poet of the 17th century, was the son of Alexander Preti, a Tuscan, and knight of St. Stephen. He was brought up as a page in the court of Alfonso II., duke of Ferrara, and afterwards lived with prince Doria at Genoa. He had been

intended for the legal profession, but it did not accord with his feelings, and he applied himself entirely to the composition of Italian verse. His works were read, admired, and translated into various languages; but they were suited to the taste of that particular period only, and have long since fallen into neglect. Preti became a favourite at the court of Rome, and was appointed by cardinal Fr. Barberini, his secretary, in a legation to Spain. He died on the journey to Barcelona, in the year 1626, being in the flower of his age. Moreri.

PRETIUM SEPULCHRI, in old *Law Books*, &c. those goods accruing to the church in which a corpse is buried.

In the Irish Canons, lib. xix. cap. 6. it is ordered, that along with every body that is buried, there go his cow, horse, apparel, and the furniture of his bed; none of which may be disposed of otherwise than for the payment of debts, &c. as being familiars and domestics of the deceased.

PRETOR, PRÆTOR, an eminent magistrate, or minister of justice, in ancient Rome; accordingly we often find a balance on the medals of the pretors.

The title of pretor is derived a *præundo*, or, *præesse*, denoting the superiority of his jurisdiction.

In the first ages of the commonwealth, all the great magistrates were stiled pretors; afterwards, the title was bestowed on all the principal officers of the army; at last, pretor became restrained to a particular magistrate.

About the year of Rome 386, the people soliciting to have one of the consuls always chosen from among themselves, the senators granted it, on condition, that a new magistracy should be erected, to be filled wholly from among the patricians; such was the origin of the *preture, pretura*; which, Livy observes, was first discharged by Spurius Furius Camillus, in the year of Rome 387; and whose office was to look to the administration of justice and equity between man and man; much in quality of a lord chief justice, or lord chancellor, or rather both in one.

But business increasing, in proportion as the empire was enlarged, a second pretor was created, A. U. C. 510, to take cognizance of the affairs of foreigners residing at Rome; upon which the former was distinguished by the title of *pretor urbanus*, or *major*; and the latter, by that of *pretor præregrinus*, or *minor*.

In the year 526 of Rome, when Sicily and Sardinia were reduced into Roman provinces, two more pretors were created to assist the consuls in the government of the provinces; and as many more upon the entire conquest of Spain, A. U. C. 556. Sylla, in the year of the city 672, increased the number to eight; Julius Cæsar, in the year 707, augmented them first to ten, and then to sixteen; under the reign of Augustus there were first ten pretors, and afterwards sixteen; two of whom were called *pratores cereales*, as being charged with the providing of corn and grain; to which number Claudius added two others, *viz. pratores fidei commissarii*. In the Code, lib. i. tit. 39. we find a law of the emperors Valentinian and Marcian, which reduces the pretors to three.

In the time of Justinian, the office of pretor was entirely abolished.

The office of the pretor, or prætor urbanus, was to render justice in the city; he had a power to interpret the laws, to supply and reform them; and even to make new ones, when the public good required. See CIVIL law.

In the Institutes, the edicts of the pretors are called *jus honorarium*; whence it should seem they had only the force of laws out of respect to that eminent magistrate; the business of the pretor being rather to look to the observation of the old laws than to make new ones. See EDICT.

Some are of opinion, he had not the *jus gladii*, the power of the sword; the cognizance of criminal matters being the special province of the prefect of Rome. See PREFECT.

But others are of another sentiment. In the general, it is very difficult to fix precisely how far his power extended.

When he walked, he was preceded by six lictors; and was clothed with the robe called *pretexa*; he sat in a curule chair; his tribunal was elevated in form of a semicircle; and he bore a spear and sword.

His authority, like that of the other magistrates, was very much weakened and reduced under the emperors. In the Digest and Code is a title *de officio pretoris*.

PRETOR was also a title among the Romans, given the governor of a province, who had served the office of praetor. Whence provinces governed by pretors, or restrained to those who had discharged that office, were called *pretorian provinces*.

PRETORIAN GUARDS, or *Bands*, *praetoria cohortes*, were the soldiers of the emperor's guard; so called, as some imagine, from their place or station in the palace or court called praetorium.

They were originally nine or ten thousand men (for Tacitus and Dion are not agreed upon the subject), divided into as many cohorts. Vitellius increased them to sixteen thousand, and as far as we can learn from inscriptions, they never afterwards sunk much below that number.

Their institution is owing, as some say, to Scipio Africanus, who first established a company of the bravest men in his army, selected for the purpose, to be his guard, and never to stir from his side in battle.

But by others, their institution is derived from Augustus. That crafty tyrant, says Mr. Gibbon, (Hist. vol. i.), sensible that laws might colour, but that arms alone could maintain, his usurped dominion, had gradually formed this powerful body of guards in constant readiness to protect his person, to awe the senate, and either to prevent or to crush the first motions of rebellion. He distinguished these favoured troops by a double pay, and superior privileges; but as their formidable aspect would at once have alarmed and irritated the Roman people, three cohorts only were stationed in the capital, whilst the remainder was dispersed in the adjacent towns of Italy. But after fifty years of peace and servitude, Tiberius ventured on a decisive measure, which for ever rivetted the fetters of his country. Under the fair pretences of relieving Italy from the heavy burden of military quarters, and of introducing a stricter discipline among the guards, he assembled them at Rome, in a permanent camp, which was fortified with skilful care, and placed on a commanding situation, close to the walls of the city, on the round summit of the Quirinal and Viminal hills. In the civil war between Vitellius and Vespasian, the pretorian camp was attacked and defended with all the machines used in the siege of the best fortified cities.

Such formidable servants are always necessary, but often fatal, to the throne of despotism. By thus introducing the pretorian guards, as it were, into the palace and the senate, the emperors taught them to perceive their own strength, and the weakness of the civil government; to view the vices of their masters with familiar contempt, and to lay aside that reverential awe, which distance only, and mystery, can preserve, towards an imaginary power. In the luxurious idleness of an opulent city, their pride was nourished by the sense of their irresistible weight; nor was it possible to conceal from them, that the person of the sovereign, the authority of the senate, the public treasure, and the seat of empire, were in their hands. To divert the pretorian bands from these dangerous reflections, the firmest and best esta-

lished princes were obliged to mix blandishments with commands, rewards with punishments, to flatter their pride, indulge their pleasures, connive at their irregularities, and to purchase their precarious faith by a liberal donative, which, since the elevation of Claudius, was exacted as a legal claim, on the accession of every new emperor. The power which they asserted by arms, their advocates attempted to justify by arguments; and maintained that, according to the purest principles of the constitution, their consent was essentially necessary in the appointment of an emperor. The pretorians, having violated the sanctity of the throne, by the atrocious murder of Pertinax, dishonoured the majesty of it by their subsequent conduct. Sulpicianus, the emperor's father-in-law, and governor of the city, treated with them for the imperial dignity; but some of the more prudent of the pretorians, apprehending that by a private contract they should not obtain a just price for so valuable a commodity, ran out upon the ramparts, and loudly proclaimed, that the Roman world was to be disposed of to the best bidder by public auction. This infamous offer at length reached the ears of Didius Julianus, a wealthy senator, March 28th, A.D. 193; and he determined to outbid Sulpicianus, who was in actual treaty for the crown. The latter had actually offered a donation of 5000 drachmas (above 160*l.*) to each soldier; when Julian, eager for the prize, advanced at once the sum of 6250 drachmas, or upwards of 200*l.* sterling. The bargain was immediately concluded, and he was declared emperor. But the day of his elevation to the throne was followed by a sleepless night, during which he probably revolved in his mind his rash folly, the fate of his virtuous predecessor, and the doubtful as well as dangerous tenure of an empire, which had been purchased by money, and not acquired by merit. He soon found himself on the throne of the world without a friend, and without an adherent. The guards themselves were ashamed of the prince whom their avarice had induced them to accept; nor was there a citizen who did not consider his elevation with horror, as the last insult on the Roman name. When the Pannonian legions, by which Septimius Severus, their commander, had been saluted with the names of Augustus, Pertinax, and Emperor, April 13th, A.D. 193, were advancing towards Rome, Julian found himself reduced to a state of the utmost distress; and in order to protract his ruin, implored the venal faith of the pretorians, who, ashamed of utterly abandoning him, and yet trembling at the name of the Pannonian legions, put on arms with reluctance. At length, however, he was deserted even by the pretorians; and condemned and executed by order of the senate, June 2, A.D. 193. Before the new emperor entered Rome, he issued his commands to the pretorian guards, directing them to wait his arrival on a large plain near the city, without arms, but in the habits of ceremony, in which they were accustomed to attend their sovereign. The haughty troops obeyed his mandate with a contrition, which was the effect of their just terrors. A chosen part of the Illyrian army encompassed them with levelled spears. Severus mounted the tribunal, and having sternly reproached them with perfidy and cowardice, dismissed them with ignominy from the trust which they had betrayed, despoiled them of their splendid ornaments, and banished them, on pain of death, to the distance of 100 miles from the capital. During the transaction, another detachment had been sent to seize their arms, occupy their camp, and prevent the hasty consequences of their despair. The pretorians, who had murdered their sovereign, and sold the empire, thus received the just punishment of their treason.

The next object to which Severus directed his attention

was an institution of guards, formed on a new model, and increased to four times the ancient number. The emperor flattered himself that these newly chosen pretorians would be regarded by the legions as the representatives of the whole military body, and that the present aid of 50,000 men, so well selected and armed, would for ever crush the hopes of rebellion, and secure the empire to himself and his posterity. The command of these troops was entrusted with an officer, denominated the pretorian prefect. See PREFECT, *Pretorian*.

By the prudent measures of Diocletian, the number of the pretorians was insensibly reduced, their privileges were abolished, and their place was supplied by two faithful legions of Illyricum, who, under the new titles of Jovians and Herculians, were appointed to perform the service of the imperial guards. The pretorians, having taken a decided and active part with Maxentius against Constantine, knew that their offences were beyond the reach of mercy; and, therefore, in the battle between these two leaders, fought near Rome, October 28th, A.D. 312, they were animated by revenge and despair. Notwithstanding their repeated efforts, these brave veterans were unable to recover the victory: they obtained, however, an honourable death; and it was observed, that their bodies covered the same ground which had been occupied by their ranks. The pretorian guards, whose numbers and privileges had been restored, and even augmented, by Maxentius, were for ever suppressed by Constantine. Their fortified camp was destroyed, and the few who had escaped the fury of the sword were dispersed among the legions, and banished to the frontiers of the empire, where they might be serviceable, without again becoming dangerous. Gibbon's Hist. vols. i. and ii.

PRETORIUM, PRÆTORIUM, among the Romans, the place, hall, or court, wherein the pretor of a province lived, and wherein that magistrate sat to administer justice to the people.

There were of these pretoriums in all the cities of the Roman empire. The scripture mentions that of Jerusalem under the name of *judgment-hall*; and there are still some remains of one at Nîmes, in Languedoc.

PRETORIUM was also the tent or pavilion of the general of the Roman army; wherein councils of war, &c. were held.

From the time of Augustus, the emperor's tent in the camp was distinguished by the title of *prætorium Augustale*.

PRETORIUM was also a place in Rome where the pretorian guards were lodged.

Some will have the pretorium to be properly the tribunal of the præfectus prætorii, or an auditory destined for the rendering of justice in the emperor's palace. See PREFECT and PRETORIAN *Guards*.

This they argue from St. Paul's Epistle to the Philipians; and from this place called prætorium, they will have the guards to have been denominated prætoriani, because assembled here for the emperor's safety.

Others will not allow the pretorium to be any tribunal, or seat of justice, but merely the imperial guard-house.

Perizonius has an express dissertation to prove, that the pretorium was no court of justice in St. Paul's time; but the camp or place where the pretorian guards were quartered.

He adds, that the name pretorium was not given to places where justice was administered till a long time after; when the office of the præfectus prætorii was converted into a civil function.

PRETSCH, in *Geography*, a town of Saxony, on the

Elbe; 50 miles N.W. of Dresden. N. lat. 57° 42'. E. long. 12° 48'.

PRETTIGAU, a valley of the Helvetian republic, in the Grisons, east of Mayenfeld.

PRETTIN, a town of Saxony, on the Elbe; 20 miles S.S.W. of Wittenberg. N. lat. 51° 37'. E. long. 13°.

PRETZ, a town of Germany, in the county of Pludentz, near the river Alfens; 3 miles E.N.E. of Pludentz.

PRETZCHENDORF, a town of Saxony, in the circle of Erzgebirg; 7 miles E. of Freyberg.

PRETZLAU, a town of Prussia, in Pomerelia; 15 miles E. of Dantzic.

PREVARICATION, PRÆVARICATIO, in the *Civil Law*, is when the informer colludes with the defendant, and so makes only a feigned prosecution.

Sylvius, in his comments on Cicero, *pro Cluentio*, gives us the difference between the three terms, *calumniari*, *prævaricari*, and *tergiversari*. He, who in his accusation forges faults which were never committed, is said *calumniari*: he who undertakes one's suit, and either will not add reasons in behalf of his client, or not answer the objection of his adversary when he is able, is said *prævaricari*: and he, who desists from his accusation, and lets the suit drop, *tergiversari*.

PREVARICATION, in our *Law*, is when a man, falsely and deceitfully seems to undertake a thing, with intention that he may destroy it; *e. gr.* where a lawyer pleads booty, or acts by collusion, &c.

PREVARICATION is also used for a secret abuse committed in the exercise of a public office, or of a commission given by a private person.

PREVARICATOR, PRÆVARICATOR, in the *University of Cambridge*, is a master of arts, chosen at a commencement, to make an ingenious satirical speech, reflecting on the misdemeanors of the principal members. See TERRÆ *Filius*.

PREVENTER, an additional security to some parts of a ship and her rigging, as the

Preventer-bolts, the bolts driven through the lower end of the preventer-plates, to assist the chain-bolts in heavy strains.

Preventer-plates, stout plates or links of iron, connected to the main and fore chains by large bolts driven through their upper and lower ends.

Preventer-braces, *preventer-shrouds*, *preventer-stays*, are additional ropes to succour the masts and yards in a gale of wind, when those they have affinity to are not supposed sufficient to bear the whole strain. See TACKLE.

Preventer-brace pendants are intended as substitutes for the brace-pendants, should they be shot away in action. See PENDANT.

PREVENTION, PRÆVENTIO, in the *Canon*, &c. *Law*, the right which a superior person or officer has to lay hold of, claim, or transact, an affair, prior to an inferior one, to whom otherwise it more immediately belongs.

The word is chiefly used in speaking of the pope's preventing the ordinary collators; and of the royal judges preventing subaltern ones.

The Roman canonists maintain, that the pope, who is the source of all jurisdiction, has not transmitted it privately to the ordinary collators; but that he may still not only collate concurrently with them, but he also may prevent them by using his original power as head of the church.

These preventions are grown odious in several countries, where they do not now obtain without many modifications

and restrictions; and the civil power in France always judges in favour of the ordinary collators.

The pope has no prevention to the prejudice of lay-patrons; but by the concordat he has reserved to himself the right of conferring elective benefices by prevention, and even cathedral and collegiate dignities.

If the provisions of the pope, and collations of the ordinary, bear date on the same day, the ultramontane canonists give the preference to the pope; the French to the ordinary.

The cardinals have a particular indulgence not to be prevented by the pope within six months. See EXPECTATIVE *Graces*, and PROVISIONS *by Prevention*.

PREVENTION, *Homicide for*. See HOMICIDE.

PREVENTIVE JUSTICE, in the *English Laws*, consists in obliging those persons, who are suspected on probable ground of future misbehaviour, to stipulate with and to give full assurance to the public, that such offence as is apprehended shall not happen, by finding pledges or securities for keeping the peace, or for their good behaviour. Such means of preventing the commission of crimes and misdemeanors reflect honour on the system of English jurisprudence; since *preventive* justice is, on every principle of reason, of humanity, and of sound policy, preferable in all respects to *punishing* justice. See GOOD *Abearing*, RECOGNIZANCE, and SURETY.

PREVESA, in *Geography*, a town of Albania, on the coast of the Mediterranean, at the entrance into the gulf of Arta, situated on the site of Nicopolis, built by Augustus after the battle of Actium; 20 miles S.W. of Arta. N. lat. 39° 22'. E. long. 20° 46'.

PREUILLY, a town of France, in the department of the Indre and Loire, and chief place of a canton, in the district of Loches, near which are some iron mines; 11 miles N.E. of Poitiers. The place contains 1680, and the canton 9402 inhabitants, on a territory of 275 kilometres, in 9 communes. N. lat. 46° 51'. E. long. 0° 30'.

PREVOT D'EXILES, ANTONY-FRANCIS, in *Biography*, a French writer, born in 1697; was educated among the Jesuits, and took the habit of the society, which he soon quitted to bear arms in quality of a volunteer. Being disappointed in his expectations, he retired in 1729 into Holland. Without means of subsistence he sought a resource in his pen, and published his "Memoires d'un Homme de Qualité qui s'est retiré du Monde," a romance, by which he acquired both money and reputation. It was written in a pure and elegant style, and with an elevated strain of morals. In 1733 he came to London, but meeting with little or no encouragement he returned to France, and assumed the costume of an abbé. He was now taken under the protection of the prince of Conti, who gave him the titles of his secretary and chaplain. He gave proofs of his industry by the publication of a number of works, and in 1745 he was selected by the chancellor d'Aguesseau to compose a "General History of Voyages." This work, though it occupied much of his time, did not prevent him from engaging in a variety of literary labours, which were for the most part successful. In November 1763, on his return from Chantilly, where he had been for his health, he was seized with an apoplectic fit, and being found apparently lifeless in the forest, the officers of justice hastily assembled, and directed his body to be opened to ascertain the cause of his death. It is said, that on the first stroke of the surgeon's knife he uttered a cry, and opened his eyes, but it was too late, a mortal wound had been inflicted, and he died in a short time. The abbé Prevot was a ready writer: of his original compositions; the most distinguished are his romances or novels. He

wrote several works, in which history is blended with fiction, as the "Histories of William the Conqueror, and of Margaret of Anjou." He conducted a periodical work entitled "Le Pour et Contrè," of which 20 vols. 12mo. were published. His great work was "L'Histoire generale des Voyages," 16 vols. 4to. He translated De Thou's History, Cicero's Familiar Epistles, and a number of English works, among which were the Clarissa and Sir Charles Grandison of Richardson: the manner of this writer may be traced in his own novels. Gen. Biog.

PREUSCHMARK, in *Geography*, a town of Prussia, in the province of Oberland, defended by a castle; 70 miles S.W. of Königsberg. N. lat. 53° 48'. E. long. 19° 22'. —Also, a town of Prussia, in Ermeland; 6 miles S.E. of Elbing.

PREUSCHWITZ, a town of Germany, in the principality of Culmbach; 5 miles W. of Bayreuth.

PREXIT, a small island, near the N. coast of Jamaica. N. lat. 18° 27'. W. long. 76° 40'.

PREYE, or PRYE, a sea-port town of Africa, in the kingdom of Kantor.

PREZ-en-Pail, a town of France, in the department of Mayenne, and chief place of a canton, in the district of Mayenne; 8 miles N.N.E. of Vilaine. The place contains 2835, and the canton 11,371 inhabitants, on a territory of 152½ kilometres, in 7 communes.

PREZEMISLAU, a town of Bohemia, in the circle of Czaflau; 8 miles E. of Teutsch Brod.

PREZERBE, a town of Brandenburg, in the New Mark, on the Havel; 5 miles N. of Brandenburg.

PRIA, a town of Spain, in the province of Asturia, near the sea-coast; 40 miles E.N.E. of Oviedo.

PRIAM, in *Biography*, the unfortunate king of Troy, at the time of its destruction, was the son of Laomedon, and when Troy was taken and his father slain by Hercules, he was carried away captive into Greece with his sister Hesiene. He succeeded to the throne of Laomedon, and to prevent a renewal of the disaster which had befallen his capital, he surrounded it with strong walls. The discovery of a gold mine on his territories enabled him to undertake many public works, and to decorate Troy with stately edifices, so as to render it the most splendid city in that part of the world. He raised and maintained a considerable army, which enabled him to extend his dominion, till at length he was regarded as the most powerful prince of Lesser Asia. His first wife was Arisba, by whom he had only one son; but his second wife was Hecuba, who made him father of a numerous family. He lived in great prosperity till the perfidy of his son Paris, in carrying off Helen, the wife of the Spartan king Menelaus, by whom he had been hospitably entertained, brought upon him that invasion from the confederated kings of Greece, which is so celebrated under the name of the Trojan war. After a struggle of ten years, in which he saw his territories laid waste, and his bravest sons slain, the capital taken, he was himself slain at his own domestic altar by the savage Pyrrhus, the son of Achilles. The death of Priam and the fall of Troy are dated in the year 1184 B. C. Univer. Hist.

PRIAMAN, in *Geography*, a sea-port town and district of Acheen in the island of Sumatra, on the W. coast, where the English and the Dutch had formerly settlements, and where the principal quantity of pepper was procured. The town is situated on a river too shallow for pinnaces, except at high water. Here is no fort, but a square, palisadoed with four bastions and a ditch. The air is healthy, and gold is found in the river. S. lat. 0° 40'. E. long. 99° 38'.

PRIAPE *de Mer*, in *Natural History*, a name given by

the French to a peculiar species of canalis, or tubulus marinus, called also, by some authors of that nation, the *arrofoir*.

It is an oblong and thick shell of this kind, with a large head, which is pierced through with a great number of holes, so as at once to resemble, in some sort, the glans of the penis, and the head of a common gardener's watering pot. This species is found at Amboyna.

PRIAPEIA, in *Poetry*, a name given to certain obscene epigrams, and other pieces, composed on the god Priapus; of which we have many instances in the Greek Catalecta. See **PRIAPUS**.

PRIAPISCUS, in *Surgery*, a bougie, or tent.

PRIAPISM, Πριαιπισμῶς, a continual and painful erection or tension of the virile member.

The term is derived from Priapus, a heathen god, whom the poets and painters represent in a state of erection.

As satyrs are usually painted after the same manner, the disease is also called *satyriasis*, or *satyriasmus*.

Some, however, distinguish between the satyriasis and priapismus, in that the latter is without any effusion, or desire of coition; but the former attended with both.

The immediate cause of a priapism is the heat, pungency, or acrimony of the semen, accompanied with a convulsion of the muscles of the part, which, compressing the veins and cavernous bodies, prevent the return of the blood.

The more remote causes are too hot, sharp, stimulating foods; cantharides are also found to produce the same effect, but with much more violence. There are instances of people, especially old men, who, making use of cantharides to enable them to satisfy their passions the better, have been seized with a priapism, which has been followed with universal convulsions, and even death.

With regard to the priapism, chordee, and other distortions of the penis, in the venereal disease, their treatment is the same with that of the gonorrhoea. When they prove very troublesome, the patient may take a few drops of laudanum at night, especially after the operation of a purgative through the day.

PRIAPOLITHUS, a name given by some authors to a stone found about Castro in Italy, which very aptly resembles the figure of the human penis.

PRIAPUS, Πριαιπος, a term sometimes applied to the genital parts of men; viz. the penis and testes.

The name took its rise from Priapus, a fabulous deity, particularly adored at Lampfacus, the place of his birth; who, for the extraordinary size of his parts, was exceedingly revered by the women; insomuch that the scripture seems to tell us, king Aza dethroned his mother Maachah, because she had consecrated a grove to Priapus, and presided at his sacrifices.

The Roman poets in general seem to have looked on Priapus as a ridiculous god, and are all ready enough either to despise or abuse him. Hor. lib. i. sat. 8. v. 3.

Priapus, among the Romans, was the god of the gardens and orchards, in which they placed his statues. Priapus is supposed by Banier to have been the same with Belphegor, that idol of iniquity mentioned by St. Jerom, and his worship is said to have been brought to Lampfacus, whence it passed into Greece and Italy. The mythology of the Greeks and Romans, with regard to this god, is as follows: although authors are not unanimous with regard to his parentage, yet it is most generally allowed, that he was the son of Bacchus and Venus. Juno, it is said, being jealous of that goddess, contrived by her enchantments that he should be brought into the world quite monstrous and deformed. On this account Venus removed him out of her

fight, and sent him to be educated at Lampfacus. Having afterwards become the dread of husbands, he was banished from that town; but the inhabitants, afflicted with a secret distemper, recalled him, and from that time he was made the object of public veneration, a temple was built for him, and sacrifices were instituted to his honour. Under this fiction is wrapped up the history of the propagation of the worship of this god from Egypt to Lampfacus, agreeably to an observation sanctioned by the authority of Herodotus, that the birth of a god in any country means only the introduction of his worship in that same country. Accordingly Priapus was reported to be the son of that Bacchus, or Dionysius, who made the conquest of India, and who was the same with Osiris; and Venus his mother was the same with Isis. This Egyptian queen, as it has been said, had introduced, after the death of her husband, the infamous ceremony of the "Phallus." This is supposed by Banier to be the whole mystery of Priapus, who was represented in so obscene a manner. We shall throw a veil over the obscenities that accompanied the worship of this god, to whom they sacrificed an ass. The principal feast of Priapus was celebrated by women, the chief of whom was a priestess, who anointed the statue of the god, while others presented to him baskets full of fruits and vases full of wine, as to the god of the gardens and of the country. Others of them appeared in the attitudes of dancers, playing upon an instrument not unlike a hoop; another held a flute, and another again a sistrum, whence it has been inferred that this was an Egyptian ceremony; others were employed in sacrificing the ass which was offered to him. Other figures, which Banier decyphers, occur in the print of a bas-relief representing that feast, given by Broisart.

PRIBODA, in *Geography*, a town of Sweden, in the province of Smoland; 76 miles S.S.W. of Carlscrona.

PRIBORN, a town of Silesia, in the principality of Brieg; 18 miles S.W. of Brieg.

PRICE, JOHN, in *Biography*, a famous English performer on the common flute, in the service of Lewis XIII. of France, celebrated by Merfennus, lib. 2. de Instrum. Harmonic. Prop. 2.

PRICE, RICHARD, a celebrated writer of the 18th century, the son of a dissenting minister at Bridge-end, in Glamorganshire, was born at Ty-yn-ton, the 22d of February 1723. He received his grammar-learning at Neath, whence he removed, in 1735, to Pentwyn, in Carmarthenshire, where he was placed under the care of the Rev. Samuel Jones. Being designed for the ministerial profession, he was, after continuing under Mr. Jones's instructions about four years, sent to the academy of the Rev. Vavasor Griffith, at Talgarth, in Brecknockshire. Our author's father was, in his religious sentiments, a rigid Calvinist; but he himself, while very young, had been inspired by his tutor, Mr. Jones, with a desire to think for himself; and began at an early period to start doubts on the subject of predestination, and other points of the Calvinistic creed, by which he sometimes incurred the anger of his father, who could not endure to hear any thing advanced against, or that might seem to shake his favourite system. Being one day caught in the act of reading a volume of Dr. Clarke's sermons, his father snatched away the book, and threw it in the fire. Such a line of conduct was not calculated to repress the young man's curiosity. But the zeal of the parent went much beyond this, and is supposed to have influenced him in bequeathing a small part of his property only to Richard, on account of his deviations from the line of *orthodoxy*, falsely so called; while he left a considerable fortune to his elder brother by a former marriage. By the death of his father

father and mother in the years 1739 and 1740, Richard was left, in a considerable degree, dependent on his uncle, the Rev. Samuel Price of London, who was co-pastor with Dr. Watts; and he was accordingly removed from Talgarth to London, and entered a student in the academy, of which Mr. Eames was the principal tutor. Here he cultivated with great diligence and success the different branches of academical learning, particularly the mathematical sciences and moral philosophy, in which he hereafter acquired an unfading reputation. For the direction of young students, who may be ambitious of following the steps of this great and good man, and whose labours have proved so beneficial to the country and the world, we will add that the books which he read were select rather than numerous; but he studied them with the closest attention; and the more strongly to impress the matter on his mind, he early commenced an excellent practice, which he continued for many years, *viz.* of drawing up analyses of them in his commonplace book. After residing at Mr. Eames's academy four years, he became domestic chaplain to Mr. Streatfield of Stoke-Newington; which situation, while it gave him ample leisure for study, afforded him opportunities of assisting with his services the ministers and congregations in and about London. In 1757 he married, and in the following year he settled at Newington-Green, and became pastor of the congregation there. In this same year Mr. Price made his first appearance as an author, in a work entitled "A Review of the principal Questions and Difficulties in Morals, particularly those relating to the original of our Ideas of Virtue, its Nature, Foundation, Reference to the Deity, Obligation, Subject, Matter, and Sanctions," 8vo. The scheme of morals which he adopts depends chiefly upon the hypothesis, that the power which perceives and determines concerning actions is the understanding, and not the moral sense, as maintained by Dr. Hutcheson. For this he contends, in order to establish the important inference, that *morality* is immutable and eternal, not the arbitrary production of any power human or divine, but equally everlasting and necessary with truth and reason. Having laid the foundation of his system, he applies it to the explication and proof of some of the principal doctrines and facts of natural religion, particularly the moral attributes of God, his moral government, and a future state of rewards and punishments. This work, which was written with great ability, advanced the author at once to a very respectable rank among moral and metaphysical writers; and it was acknowledged, by all capable of appreciating its value, to be the most able defence of those principles in the English language. A new edition, being the third, of the volume, with considerable improvements, was published in 1787. In the preface Dr. Price says, it was published "thirty years ago, and was then the author's first production, and contained the result of some of his earliest thoughts. A careful revival has now made it the result of his latest and maturest thoughts." To this edition is added a Dissertation on the Being and Attributes of the Deity. To return to the author:—in the year 1763, he was chosen afternoon preacher to the congregation in Poor Jewry street, London, which had enjoyed the ministerial services of a Benson and a Lardner. About the same time he was elected a fellow of the Royal Society of London, to whose Transactions he had been a frequent and valuable contributor. In 1767 he published Four Dissertations: 1. On Providence. 2. On Prayer. 3. On the Reasons for expecting that virtuous Men will meet after Death in a State of Happiness. 4. On the Importance of Christianity, the Nature of historical Evidence, and Miracles. These dissertations, in which it has been justly said

"philosophy and piety form a happy union," have gone through several editions.

In the year 1769, the university of Aberdeen, out of pure respect to Mr. Price's extraordinary merits, presented him with the diploma of doctor of divinity. In the following year he was chosen pastor of the congregation at the Gravel-pit meeting, Hackney, where he became distinguished as a most impressive and interesting preacher. His next work, which appeared in 1771, was entitled "Observations on reverfionary Payments; on Schemes for providing Annuities for Widows, and for Persons in old Age; on the Method of calculating the Values of Assurances on Lives; and on the National Debt," &c. The advice and instruction contained in this book were peculiarly seasonable, as various societies, professedly for the benefit of aged persons and widows, were at that time continually rising up, which, as they were founded on false principles, threatened to be productive of the most alarming evils. By the publication of this work of Dr. Price, many of the societies were induced to reform their plans; others were deserted by the public; and some, which were heedless of admonition, speedily came to ruin. After three editions of it had been sold, the author prepared a fourth, which he published in 1783, in 2 vols. 8vo. To the subsequent editions, of which there have been several, a very able general introduction has been prefixed by the author's nephew, William Morgan, esq., the distinguished actuary of the "Society for Equitable Assurances on Lives and Survivorships," who has likewise improved the body of the work by notes, tables, &c. the result of many years' experience. One chapter in this work contains interesting observations on public credit, and the national debt; points out the erroneous policy of that misapplication of the sinking fund, which, with the consent of parliament, ministers had practised from the time of sir Robert Walpole, and demonstrates the efficacy of such a fund, when inviolably applied, in extinguishing the public debts, and essentially contributing to promote national security and welfare. These important topics were further discussed in a work, entitled "An Appeal to the Public on the Subject of the National Debt," which was published in 1772. During the civil war, which terminated in the independence of the American colonies, Dr. Price united with those true friends to the country, who protested against the injustice and madness of those proceedings, the issue of which justified their predictions. It was at this period he published his, "Observations on the Nature of Civil Liberty, the Principles of Government, and the Justice and Policy of the War with America." In these Observations, his notions of government correspond with the principles taught by Locke, and all the writers on civil liberty, who have been most admired in this country; and he demonstrated the measures pursued by administration against America to be inconsistent with justice, the principles of the constitution, and the honour of the kingdom. For this work the common council of London, as a testimony of their approbation of the principles inculcated in it, presented the author with the freedom of the city in a gold box. In 1778 he published "Additional Observations on the Nature and Value of Civil Liberty, and the War with America," &c. Dr. Price also published, at the same time, a general introduction to both pieces, and a supplement. The next publication in which Dr. Price was concerned, was "A free Discussion of the Doctrines of Materialism and Philosophical Necessity," in a correspondence between Dr. Price and Priestley. In 1779 our author addressed some important observations to the "Society for Equitable Assurances," in an introduction to a work by his nephew,

nephew, Mr. Morgan, on "The Doctrine of Annuities," &c. To the exertions of this excellent man, and the indefatigable zeal of his nephew, the prosperity of that society, on which the happiness and even existence of thousands are continually depending, is almost entirely owing.

When the earl of Shelburne was prime minister, he sought the assistance of Dr. Price in forming a scheme for paying off the national debt, and moved an introductory resolution on that subject in the house of lords; but upon his being driven from office, the scheme was abandoned. It was, however, communicated to the public by Dr. Price in a treatise, entitled "The State of the public Debts and Finances, at signing the preliminary Articles of Peace in January 1783; with a Plan for raising Money by public Loans, and for redeeming the public Debts." After this, when Mr. Pitt determined to introduce a bill into parliament for liquidating the national debt, he applied to Dr. Price for his advice on the subject, and received from him three separate plans; one of which, said to be the least efficient in its operation, was adopted by the minister, though without the slightest acknowledgment of his obligations, and now forms the foundation of that act for reducing the public debt, which was established in 1786, and has contributed more than any other, or all other measures, to raise the credit of his administration. See PITT.

In the year 1784 Dr. Price published "Observations on the Importance of the American Revolution, and the Means of making it useful to the World;" which observations breathed an ardent spirit of virtue and benevolence, and afford salutary advice on various important points highly interesting to the new government. To these observations are added a letter from M. Turgot, containing remarks which merit the attention of all free governments; and the last will of M. Fortune Ricard, which exhibits an amusing, and rather humorous application of Dr. Price's account of the powers of compound interest, and the uses to which it may be applied for the benefit of mankind. In 1786 he published a volume of sermons, partly on practical, and partly on doctrinal subjects: in the latter he states, and defends with animation and zeal, the Arian hypothesis, to which he himself was attached, against Trinitarians on the one hand, and modern Unitarians on the other. The practical sermons, on the security and happiness of a virtuous course, on the goodness of God, and on the resurrection of Lazarus, are replete with the soundest reasoning, and the most glowing eloquence.

The other publications of this excellent divine, which chiefly attracted notice, were two sermons preached before his congregation at Hackney, on the fast days in 1779 and 1781:—A sermon on "The Evidence of a future Period of Improvement in the State of Mankind, with the Means and Duty of promoting it, delivered to the Supporters of the new Academical Institution among Protestant Dissenters," in the year 1787; and his "Discourse on the Love of our Country," preached the 4th of November, 1789, before the society for commemorating the revolution of 1688 in Great Britain. In this last discourse Dr. Price displayed his well-known zeal for the great principles of civil and religious liberty, and towards the conclusion of it, he adverted with triumph to the revolution in France, which in its origin augured well for the happiness of the world; and it was hoped by unnumbered thousands at that time, as well as by the benevolent and kind hearted doctor Richard Price, that it was a prelude to a general amendment in human affairs, and that hereafter, and at no great distance of time, "the dominion of arbitrary kings would be changed for the dominion of laws, and that

the dominion of priests would shortly give way to the dominion of reason and conscience." Such a prospect he thought could not but be peculiarly gratifying to Englishmen who understood and valued their own rights and privileges. There were, however, others who lamented over the downfall of tyranny in France, and who were at this period advocates for the divine rights of kings, notwithstanding their present principles belied all the former acts and exertions of their past lives. These, because they could not produce reason and argument in justification of their notions, descended to the vilest calumnies, and made up in violence what they were deficient in truth. At the head of these stood the late Edmund Burke, who in his speeches in parliament, and in his work entitled "Reflections on the Revolution in France, &c." endeavoured to expose Dr. Price to public odium, by illiberally, and contrary to his better knowledge, describing him, who was one of the most benevolent of all men, as exulting in the horrid outrages committed by the infuriated French populace, and by loading him with such epithets of contempt, as his exuberant imagination, unrestrained by any regard to truth or decency, could supply. The invectives and abuse of the senator, shortly afterwards admitted on the list of pensioners, Dr. Price thought it beneath him to notice; but in a preface to a new edition of his discourse, he vindicated his principles and conduct perfectly to the satisfaction of the unprejudiced part of the public. He was hastily drawing to his end. He had in the year 1786 lost his lady, and in February 1791 he was seized with a fever, the effects of a severe cold, which he took while attending the funeral of a friend; from the effects of this he was gradually recovering, when he was attacked with a severe and very painful disorder, by which he had been many years threatened. This he bore with fortitude and resignation, though occasionally his spirits and strength were entirely exhausted by the agonies which he endured. He died on the nineteenth of March 1791, in the sixty-eighth year of his age, beloved by all who had the honour of his acquaintance, and respected by the wise and the virtuous capable of appreciating his labours, and the value of the services which he performed for his country and the world.

Of Dr. Price's distinguished abilities as a mathematician, moralist, and lover of his country, we have given ample proof. In his profession as a dissenting minister he was ardent and zealous, anxious to promote the best interests of those who attended his services. In the pulpit his manner was natural, and very earnest; and in his devotional exercises, there was a degree of fervour, which indicated the strongest sensibility as well as sincerity in himself, and which communicated its warmth to those who joined with him. He was for many years one of the trustees to the estates of the late Dr. Daniel Williams, which is the most important concern belonging to the London Dissenters. During the applications of the dissenting ministers to parliament, from 1772 to 1779, for relief from subscription to the articles of the church of England, required by the act of Toleration, he was chosen one of the committee appointed to concert and pursue the necessary measures for obtaining that object; but when he found that it could not be obtained without a declaration of faith in the holy scriptures, which he contended the civil magistrate had no right to demand, he divided with a small minority of his brethren against the rest of the committee, refusing an enlargement of religious liberty on terms which, according to their views of things, and according to the true principles of dissent, implied submission to the authority of the civil magistrate in matters of conscience, to whom, in matters of

this kind, they owed no obedience whatever. In 1783 the degree of LL.D. was conferred upon him by Yale college, in Connecticut, and he was afterwards elected a fellow of the American Philosophical Societies at Philadelphia and Boston. In the year 1786, when a new academical institution among the Dissenters was established at Hackney, Dr. Price was appointed tutor in the higher branches of the mathematics; to three of the pupils he gave some lectures, but he soon resigned the office into the hands of his nephew the Rev. George Cadogan Morgan, of whom we may, having omitted it in its proper place, say a few words.

This gentleman, whose father was a respectable surgeon at Bridge-end, Glamorganshire, and mother the sister of Dr. Price, was born in 1754. He was intended for the church, but being dissatisfied with the articles, he entered himself as a pupil in the dissenting academy, then under the direction of Drs. Savage, Kippis, and Rees. In 1776 he settled as a minister with a congregation at Norwich. Here he resided till 1785, when he removed to Yarmouth, which he left in the following year, in order to join his uncle at Hackney. Here he became afternoon preacher at the Gravel-pit meeting, and lecturer at the New College. These offices he resigned about the year 1792, and employed his great talents in educating a select number of young people in his own house. He died at Southgate on the 17th of November 1798, at the early age of forty-four, sincerely regretted by all who knew him. He had, about four years before his decease, given the world a work in two volumes, entitled "Lectures on Electricity," which has long since been out of print. He is known also by a valuable and important paper, communicated in the year 1785 to the Royal Society, containing "Observations and Experiments on the Light of Bodies in a state of Combustion." This paper was published in the 75th volume of the Philosophical Transactions. He was an advocate for the principles of Stahl, in opposition to the system of Lavoisier and the French chemists. (See PHLOGISTON.) He was a man of incessant application, rose very early, and often studied to a late hour. In the pursuit of science he was ardent and enthusiastic. The ardour which glowed in his own breast, he had the happy art of infusing into the minds of others. He was a warm and steady friend, and ever ready to afford assistance to those who stood in need of his aid and friendly countenance, as numbers now living can testify, among whom the writer of this article rejoices in the opportunity of ranking himself.

But to return to Dr. Price: besides the articles already mentioned, he published some single sermons, and contributed various papers to the Philosophical Transactions, which may be found inserted in different volumes from 1763 to 1786. Among his numerous correspondents, were the marquis of Lansdowne, the earls Chatham and Stanhope, the bishops of Carlisle, St. Asaph, and Llandaff, Mr. Harris, the author of Philosophical Arrangements, &c., Mr. Howard, Dr. Franklin, the duke de Rochefoucault, the celebrated Turgot, and several of the most distinguished members of the first national assembly. We shall close this article with the character of its subject, as it is partly given by one of his biographers. Though strictly attentive to the obligations of domestic life, he did not suffer his private affections to encroach upon his social duties. His talents and labours were ever ready at the call of friendship; nay, so much did his nature abound with the milk of human kindness, that he could not resist, without extreme reluctance, even troublesome and unseasonable solicitations. His hours of study and retirement were frequently broken in upon for assistance and advice, especially in matters relating to an-

nities and life assurances; and in this way he sacrificed much of his personal convenience to individuals of whom he knew but little, and from whom he would accept of no pecuniary recompence. A fifth part of his annual income was regularly devoted to charitable purposes; and he was laudably anxious to distribute it in such a way, as might produce the greatest good. Simplicity and humility were among the strongly marked features of his character. No man was ever apparently less sensible of his own excellencies, nor less elated by his own celebrity; and in no man was the dignity of artless manners and unaffected modesty more happily displayed. His face was the true index of his mind. It beamed with philanthropy, and when lighted up in conversation with his friends, assumed an aspect peculiarly pleasing.

PRICE, in *Political Economy*, is the exchangeable value of a commodity for which it may be procured at pleasure. As the value of the acknowledged general medium of exchange is universally known, it is most peculiarly adapted to mark the price of commodities in general. Hence price may be defined a certain proportion of the general medium of exchange, deemed equal to the value of the thing or things to be obtained for it in exchange: in other words, price is the equivalent of a commodity expressed by the general medium of exchange. The bare amount of the pieces of money, or of other things to be given for a commodity, constitutes its *nominal* price; the influence of the three producing powers, *labour*, *land*, and *capital*, in the production of the commodity, expressed by the value in money which must be given to obtain it, constitutes its *real* price. Advances necessary to obtain a commodity are called *costs*. The aggregate of the costs, which the production or original acquisition of a commodity required, may be denominated its *cost* price: and the price at which a commodity may be purchased at pleasure constitutes its *market* price. The cost price depends on the price of the causes necessary to produce a commodity, or to make its primary acquisition. These causes are either *necessary*, that is, such as lie in the nature of the commodity itself, and without which it could not have been produced or acquired: or they are *voluntary*, that is, such causes might have been dispensed with: or they are *accidental*, that is, they have their foundation in certain adventitious circumstances. When the price of a commodity is only the equivalent to the necessary causes of its existence, it is called its *natural* price; when it is a compensation for the voluntary causes of its existence, it is an *artificial* price; and when it is a compensation for adventitious causes, an *accidental* price.

The necessary efficient causes, through one or the other of which, singly or combined, any commodity is originally sent to market, and without either one or the other of which no commodity can be produced or acquired, are, 1. *Land* or *soil*, which is the basis of our existence, and of all our operations; and furnishes us with all kinds of useful raw materials. 2. *Labour*, which is indispensable to obtain food, and to provide us with convenient dwellings. And 3. *Capital*, or a stock previously accumulated to afford advances, pay wages, and procure implements, tools, engines, &c. without which many labours could not be performed.

As land, labour, and capital, have a share in the producing of almost all commodities, every commodity produced, or its value, must be divided among those who produced it, in proportion to the share they had in its production. One part is assigned to the land-holder, another to the labourer, and a third to the capitalist. If a single individual should be land-owner, labourer, and capitalist, the whole commodity, or the whole of its value, would of course belong to him alone.

The

PRICE.

The land-owner may lend his land to the capitalist or to the labourer: the capitalist may lend his capital or stock to the labourer or the land-owner: and the labourer may lend his industry to one or both of them. And as neither is willing to lend the source from which he may obtain useful things for nothing, the individual to whom it is lent must give in return part of the commodity which the use of the loan helps him to gain, either in kind, or its value in any other acceptable commodity. What the labourer receives for the loan of his industry, is called the *wages of labour*; whatever is received for the use of a capital is called *profit of stock*; and what is received for the mere permission to use a portion of land or soil, is called *rent*. The proper employment of capital requires diligence, ability, and a certain degree of resolution, as the want of such qualities frequently induces owners of capital to entrust it to the use of others. In this case the owner of the stock is particularly called a *capitalist*, and the individual who employs the stock has been sometimes denominated an *undertaker*. The *PROFIT of Stock*, (which see,) must in such instances be divided, in certain proportions, between the capitalist and undertaker. As individual interest is universal in the human race, and no man either labours, or lends a portion of his soil or of his stock for nothing, no commodities would be produced, if the necessary causes of their production were not compensated, that is, if those who contribute to their production did not receive some compensation. Consequently, the first or cost price of all useful commodities must afford an equivalent for the wages of the labourer, the profit of the stock, and the rent of the soil employed in the production. Wages of labour, profit of stock, and rent, are the elements into which the original value of all commodities may ultimately be resolved: they are the elements of the cost price of every useful thing. Every cost price does not comprize all three elements together, because it is not every thing that requires the co-operation of the three efficient causes towards its production, but the prime or cost price of no commodity can be composed of any other elements, and when a commodity ceases to obtain its cost price, it ceases to be produced, and whether the price of the elements or causes of the commodity be natural or artificial, it must always be fully replaced if the commodity is to be farther produced or brought to market. The price of every thing, in fact, is regulated by the price of the elements of which it is composed. This price is, however, fluctuating, the causes of which we shall soon point out; but previously to this it will be necessary to inquire into the circumstances which regulate the market price, and to shew in what it deviates from the cost price.

The chief inducement to produce any commodity, or to accumulate a stock, is the probability that there will be a demand for them, and of course will meet with purchasers. But to become purchasers, people must not only wish for the commodity, but must have wealth sufficient, or a surplus of commodities to give in exchange. The desire to be possessed of a thing, combined with the means of acquiring it, is called the *demand*. The demand for a commodity, or the anticipation of a demand for a commodity, is the primary cause why it is produced, or a stock of it provided; those who wish for it must offer to give, at least, the whole cost price for the commodity. As soon as this is the case, many individuals are ready to satisfy that demand, and the owners of the article in demand look out for purchasers: this looking out for buyers is called the *offer for sale*. If the offer for sale and the demand were always equal, commodities would always bring their prime or cost price. But as this equality is frequently destroyed, it often happens that

either more or less than the cost price is paid for a commodity.

A place especially devoted to the business of buying and selling, is called a *market*, and the price at which goods are bought and sold there, is called the *market price*. They are, however, only those commodities that are in general request, that are brought to market, and have a market price. The sellers who bring their goods to market rarely know beforehand how great the demand for them will be. Hence many more commodities of a certain kind may be offered for sale than are sought for, or more commodities may be sought for than are in the market. "Yet," as is observed by Mr. Boileau, in his excellent 'Introduction to the Study of Political Economy,' "as the exertion to preserve and to increase wealth is pretty universal, buyers and sellers are equally anxious to profit by the circumstances most favourable to their views. The vender endeavours to dispose of his goods at the highest possible price, the purchaser to obtain them at the lowest possible price. A sort of struggle invariably takes place between the buyers and sellers before they agree. The latter study to raise the price, and wish to get as much as possible for their commodities; the former endeavour to lower it, and strive to give as little as possible for the commodities they are desirous of acquiring. By means of this struggle, a price is at length fixed, at which the venders are glad to sell, and which the purchasers are willing to give: this is the market price. The agreeing about the price is influenced by the need in which the parties stand to buy or to sell. It is want that impels alike the venders to sell and the buyers to purchase. He whose want is most pressing, or whose desire is the strongest, is obliged to yield." The market price exceeds or falls below the cost price, according to the supply of goods; but the commodity must always bring the cost price, if it be farther produced, and on this account the cost price always regulates the market price.

When one purchaser is anxious to buy before another, and one vender endeavours to be before-hand with another in disposing of his goods, there is what is called a *competition*. When it takes place among the buyers, it is a *competition of demand*; when among the sellers, the *competition of the offers of sale*. The one tends to raise, the other to depress the price; in the one case the buyers are slow in their purchases; in the other, the sellers endeavour to keep their goods out of the market, in the hope of obtaining still higher prices. It is not the whole stock of a commodity, but only that part which is actually offered for sale, that influences the price. When the whole stock is in the hands of one or a few individuals, he or they may easily suit the actual *offer for sale* to the *demand*, and may exact very high prices. But when the number of sellers is great, a combination to keep back goods is proportionably difficult; there becomes a competition of offers for sale, which instantly lowers the price. So, on the other hand, the want of competition among purchasers tends to *lower*, and an increased demand to *raise* the price.

Besides the competition of demand, and offers of sale, the price of goods is likewise influenced by the quantity and quality of the commodities, even when they are locked up in one or a few hands. Every stock of commodities is provided in the hope that there will be buyers willing to pay the usual cost price. This expectation may be disappointed either by the sudden starting up of competitors, or some unforeseen adventitious circumstances may cause the number of buyers to be materially different from that which had been reckoned upon, and as the stock in hand cannot immediately be increased or diminished agreeably to such casualties, the actual

actual abundance or scarcity of goods relatively to the demand, must always have a great influence on the fluctuation of the price of commodities. The increase of some of them depends, moreover, on chance, or such causes over which man has no sort of controul: while the increase of others rests in a great degree on the will of man. If chance be more favourable to one seller or one grower of a commodity than to another, the less favoured one is obliged to sell at the same price with the fortunate one, and probably under prime cost. The market price of such articles may more frequently, and for a longer time, deviate from the cost price, than the market price of such, of which the quantity is determined by man's free will. The quality of some goods, or their perishable nature, enforces also a quicker sale than that of others. Yet the cost price is the constant regulator of the production of goods; it is the price of the causes of the origin of commodities.

The state may influence the price of commodities in a two-fold way, either by increasing the charges or cost of their production, or by positive enactments which limit their sale and purchase. The former is chiefly effected by taxes, the latter by legal regulations. The amount of the duty laid on a certain article, or the sum by which the tax increases the wages of labour, the profit of stock, and even the rent, which are the efficient causes of that produce, is the proportion in which the cost price is raised by the tax; its market price must of course rise in the same proportion if there be no alteration in any of the other circumstances which influence the price of goods.

Prices are, in general, *raised*, 1. By exclusive rights granted to one or a few individuals, as is the case with monopolies, chartered companies, corporations, &c. 2. By laying heavy duties on the importation of foreign goods, or prohibiting them altogether. 3. By limiting the use of the soil. And 4. By favouring the exportation of certain commodities by means of bounties.

Prices are kept *low*, 1. By an unrestrained freedom of trade and commerce. 2. By regulations favouring the labours of a particular class, which invite others to the same labour, and lower the price of the produce. 3. By regulations which exclude a number of buyers from the purchase of a certain produce. But these lower the price of that produce only as long as the number of purchasers is not increased in another quarter, or as long as the produce is not reduced in proportion to the small number of buyers. Prohibiting the exportation of corn seldom causes much reduction in the price, for the fear of a scarcity increases the number of purchasers, and diminishes that of the sellers.

Regulations which fix the price of a commodity are called the *assize*. When they fix the price below the natural cost price, the commodity is no longer produced, or seeks for a market abroad. When they fix it at the natural cost price, they are unnecessary, unless the competition of sellers be restrained. Smith's *Wealth of Nations*. Boileau's *Political Economy*.

PRICE, *Current*, in *Commerce*, a weekly account of the current value of most commodities.

PRICK MADAM, in *Botany*, the name of a species of house-leek.

PRICK or *Queen Post*, in *Building*. See *POST*.

PRICK, or *Pinch*, in the *Manege*, is to give a horse a gentle touch of the spur, without clapping them hard to him.

To *prick* or *pinch*, is an aid; but to *appuyer*, or bear hard with a spur, is correction. See *PINCHING*.

PRICK *Timber*, or *Wood*, in *Botany*. See *SPINDLE Tree*.

PRICKER, in *Rural Economy*, a term applied to a brad

awl. It also signifies a sort of hook to clean horses feet with.

PRICKET, a term applied to a spitter, or young male deer of two years old, that begins to put forth the head. See *SPITTER*.

PRICKING of a horse's foot, in the *Manege*, is the hurt received by a nail driven too far in the foot, so as to reach the quick, or press the vein in the horse's foot, when he is shod.

PRICKING the chart, is the art of tracing a ship's course upon a marine chart, by the help of a scale and compasses, so as to discover its present situation.

PRICKING the sails, is the art of stitching two cloths of a sail together, along the space comprehended between the two edges, or selvages, that overlay each other. Or, it is the sewing a middle-seam between the two seams which are employed to unite every cloth of a sail to the next adjoining. See *SAIL-making*.

PRICKLE, in *Botany* and *Vegetable Physiology*, *aculeus*, a thorn originating from the bark of plants, and not connected in any manner with their wood. Such are found in *Rosa*, *Rubus*, &c. They are more permanent than *spinae*, being not liable to disappear by culture. See *SPINA* and *THORN*.

PRICKLE *Back*, in *Ichthyology*, a small fish, so called from the prickles on its sides and back. Vast numbers of these little fish are to be found in almost all fresh waters, wherever it is possible for fish to live, as Mr. Arderon informs us, *Phil. Trans.* N^o 428. sect. 15. who gives us some account of these creatures. They are very destructive to the spawn of all sorts of fish; and they themselves are tormented to death by a kind of louse of an oval figure, with eight legs and a very transparent body. This louse has little fins always in motion, whether it be swimming about or fixed on the fish. See *STICKLE-back*.

PRICKLY PEAR, in *Botany*. See *CACTUS*.

PRICKLY *Parfnep*. See *ECHINOPHORA*.

PRICKLY *Pear*, in *Geography*, a small island near the N. coast of Antigua. N. lat. 17° 8'. W. long. 61° 30'.

PRIDE, in *Mental Philosophy*, is, as Dr. Cogan has defined it, that exalted idea of our state, qualifications, or attainments, which exceeds the boundaries of justice, and induces us to look down upon supposed inferiors with some degree of unmerited contempt. (See *MENTAL PHILOSOPHY*.) When this elevated idea of ourselves becomes a motive to avoid and despise any thing mean and unworthy, its impropriety is overlooked; and as it leads to worthy conduct, it is honoured with the appellation of *laudable* pride. When it proceeds from the excess of attachment and affection to our country, founded on exaggerated ideas of its superiority; or to our relatives and friends on account of their real or imagined merit; or to our parents, in consequence of their rank or celebrity; or to children, by reason of their accomplishments or any honour conferred upon them; this kind of pride, proceeding from excess of affection, where the affection is natural, is called *pardonable* pride. When pride is manifested by an ostentatious display of wealth, station, or accomplishments, it is deemed a *vain* pride. When it is indulged to such an excess, that it looks down with disdain upon others, little inferior, or perhaps equal, or even superior in real merit; it is branded with the title of *insufferable* pride.

Mr. Hume has given a different definition of pride from that which we have above stated. Pride, as he says, is "a certain satisfaction in ourselves on account of some accomplishment, or possession, we enjoy," "The object of pride is *self*, the cause, some *excellence*," He adds, "our merit

raises pride, and it is essential to pride to turn our view on ourselves with complacency and satisfaction." But as he has made no distinction between real and supposed merit, he necessarily directs our thoughts to absolute merit; and according to his representation, there can be no place for a vicious pride, or an ill-founded confidence in our own superiority. See Cogan's Philosophical Treatise on the Passions. Notes.

PRIDE of the *Isis*, a name given by Dr. Plot to the common lampern, from its being found very plentifully and very delicate in that river. See PETROMYZON *Branchialis*.

PRIDE Gavel, a custom in the manor of Rodely in the county of Gloucester; by which, to this day, a rent is paid to the lord, by certain tenants, in duty and acknowledgment to him for their liberty and privilege of fishing for lampreys or lamprids in the river Severn.

PRIDEAUX, JOHN, in *Biography*, a learned English prelate, was born at Slowford, in Devonshire, in 1578. His parents were in very humble circumstances, and he himself was candidate, while only a youth, for the situation of parish clerk at the neighbouring church of Ugborow. He was extremely mortified at his want of success. To console him under the disappointment, a charitable gentlewoman maintained him at school till he acquired some proficiency in the Latin language. After this he was sent to the university of Oxford, where, at first, he earned his support by servile offices in the kitchen of Exeter-college, and spent his leisure hours in the diligent prosecution of his studies. The eagerness with which he pursued knowledge attracted the notice of the tutors and rector, and in 1596 he was admitted a member of the college. In 1596 he took the degree of B. A., and in 1602 he was chosen probationer-fellow of his college. In the following year he proceeded to M. A., and was shortly afterwards admitted to holy orders. In 1612 he took his doctor's degree, and having acquired a high reputation for deep and extensive learning, he was, in the same year, elected rector of his college. From this time, owing to his attention and zeal to its interests, the college flourished more than any other foundation in the university. In 1615 Dr. Prideaux was appointed Regius professor of divinity in the university of Oxford; and, in connection with that appointment, became canon of Christ-church and rector of Ewelme in Oxfordshire. He afterwards discharged the duties of vice-chancellor of the university during several years. In 1641 he was nominated by king Charles I. to the bishopric of Worcester, but owing to the state of the times he never derived much emolument from the see, and his great zeal in the king's cause exposed him to the resentment of the parliament party, and he was reduced to the greatest poverty, so that he was obliged to sell almost every thing of which he was possessed, to obtain the common necessaries of life. He died in 1650, leaving to his children no legacy but "Pious poverty; God's blessing, and a Father's prayers, and example of strict integrity and honour." His learning was extensive, and his memory prodigious. He was modest, kind, and unassuming; he was never anxious to conceal his low origin. "Could I," he was often heard to say, "have been clerk of Ugborow, I had never been bishop of Worcester." He was author of a great number of works, of many of which the titles are given in the General Biography, to which we refer the reader; also to Wood's Athen. Oxon. and Walker's Sufferings of the Clergy.

PRIDEAUX, HUMPHREY, distinguished for his great learning and talents, was the third son of Edmund Prideaux, esq. of Padstow in Cornwall, in the year 1648. Being designed by his parents for the church, he was initiated in grammar learning at the schools of Liskeard and Bodmin,

and then sent to Westminster school, under the direction of the celebrated Dr. Busby. Here he was elected king's scholar, and after three years was sent on the foundation to Christ-church-college in the university of Oxford, where he was admitted a student in 1668. In 1672 he was employed by Dr. Fell, dean of Christ-church, in publishing an edition of Lucius Florus, with notes. When this was finished, a wish was expressed that he would prepare for publication, from a MS. in the Bodleian library, the work of "Johannes Antiochenus Malela," a Greek historian, which he declined, judging it unworthy the labour. In 1676 he published his "Marmora Oxoniensia ex Arundellianis, Seldenianis, aliisque constat, cum perpetuo Commentario," by which he acquired a high reputation in the university, and also among the learned in many parts of the world. The work was eagerly sought for, and it soon became very scarce. It was drawn up in too much haste, and the typographical errors were numerous. A more correct edition was published under the care of Michael Mattare in 1732. In 1679 Mr. Prideaux was presented, by the lord chancellor Finch, with the rectory of St. Clement's, Oxford, and in the same year he published two treatises of Maimonides in Hebrew, with a Latin version, and notes, under the title of "De Jure Pauperis et Peregrini apud Judæos." During the short session of parliament at Oxford in 1680, Mr. Prideaux had the honour of attending upon the lord chancellor in the capacity of chaplain, and in the following year his lordship presented him to a prebend in the cathedral church of Norwich. In 1682 he was presented to the rectory of Bladen cum capella de Woodstock, in Oxfordshire; this was the more acceptable, as it might be held with his studentship, and the office to which he had been appointed of library-keeper in Christ-church college. In 1686 he proceeded doctor of divinity. The popish emissaries being very active, at this period, in propagating their principles, Dr. Prideaux exerted himself in opposing them, as well through the medium of the press as in the pulpit. He had now settled upon his prebend of Norwich, and observing that the clergy of that city were much intimidated by the severe measures which the king (James II.) took in serving the interests of his religion, especially in the suspension of the bishop of London, and Dr. Sharp, dean of Norwich, by his arbitrary ecclesiastical commission, and that they wholly abstained from any reference to the Popish controversy, at a time when there was most need for them to exert themselves in defence of Protestantism, he determined, by his own example, to encourage them to speak out in support of the principles which they professed, and boldly preached, in the cathedral, against the mass, declaring that, at all hazard, he was not ashamed of, nor afraid to preach, the gospel of Christ. He also distinguished himself by opposing, with all his powers, the declaration of indulgence, and by his influence, it was not read in more than four or five churches throughout the diocese of Norwich, which contains about 1200 parishes. After the Revolution he was collated to the archdeaconry of Suffolk. When the convocation met in 1689, Dr. Prideaux took an active part with the minority, who were expressing their indulgence towards dissenters, by such alterations in the canons, liturgy, and rituals of the church, as might contribute to promote the comprehension of them within the establishment. In the year 1691, upon the death of the learned Dr. Pococke, the place of Hebrew professor at Oxford was offered to Dr. Prideaux, which he declined. About the year 1696 he was presented to the small vicarage of Trowse near Norwich, which was worth only about 40*l.* per ann. but he readily accepted it for the sake of having an opportunity of exercising his ministerial functions. These

he regularly discharged till his ill state of health prevented him from going into the pulpit, when he resigned the living. In 1697 he published his life of Mahomet, which met with so favourable a reception, that the author sold three editions of it in the same year. In 1702 he was promoted to the deanery of Norwich, and immediately applied himself to the reformation of such disorders and abuses as prevailed in the cathedral. In 1710 he underwent a severe surgical operation, from the effects of which he did not speedily recover. After obtaining such a share of health as to be able to resume his studies, he applied himself to the composition of his most celebrated work, entitled "The Old and New Testament connected in the History of the Jews and neighbouring Nations," and in 1715 he published the first part of it in a folio volume, which was followed by a second in 1718. This work was so well received by the public that it went through eight editions at London, and two or three at Dublin, before the end of the year 1720, and it has been repeatedly printed, as well as translated into the French and Italian languages. Dr. Prideaux died on the 1st of November 1724, in the 77th year of his age. He had naturally a strong constitution, which enabled him to pursue his studies with the utmost assiduity till he was unfortunately afflicted with the stone. His abilities were solid rather than lively, his judgment excellent, and his learning very extensive. As a writer he is distinguished by perspicuity and precision. In his manner of living he was regular and temperate, being seldom out of his bed after ten o'clock, and generally at his studies before five in the morning. He spoke his mind with freedom and boldness, and was not easily diverted from pursuing what he believed to be right. *Biog. Brit. Gen. Biog.*

PRIEBUS, in *Geography*, a town of Silesia, in the principality of Sagan, situated on the Neisse; 15 miles S.W. of Sagan. N. lat. 51° 28'. E. long. 15°.

PRIEDAL, a town of Bohemia, in the circle of Bechin; three miles S.E. of Crumau.

PRIEDERS, a town of Germany, in the principality of Culmbach; nine miles S.E. of Bayreuth.

PRIEGO, a town of Spain, in the province of Cordova; 10 miles E. of Lucena.

PRIEL, a mountain of Austria; eight miles W. of St. Jorgen.

FRIER AGE. See **AGE**.

PRIER Aid. See **AID**.

PRIESDORF, in *Geography*, a town of Germany, in the duchy of Anhalt Cothen; two miles S. of Cothen.

PRIESEN, a town of Bohemia, in the circle of Leitmeritz; eight miles N. of Leitmeritz.

PRIEST, **SACERDOS**, a person set apart for the performance of sacrifice, and other offices and ceremonies of religion.

Thus the false gods and goddesses of the heathens had their priests; priests of Mars, of Bacchus, of Hercules, of Isis; and some of them their priestesses. See **PONTIFEX**, &c.

The Greeks, and also the Romans, had three sorts of priests; *viz.* those of Cybele, called *Galli* (which see); those of Mithras (see *Feast of MITHRA*); and those of the Orgies, or mysteries of Bacchus (see **ORGIA** and **BACCHUS**.)

When Romulus divided Rome into 30 curiæ, he instituted two priests for each, which made the whole number 60. The priests of Romulus's institution were to be at least 50 years of age, men of distinguished morals and birth, capable of maintaining themselves with honour, and free from all bodily blemishes; and as in the ministry of these priests, there were some things which could only be performed by women, the wives and daughters of the priests were employed

in such services. At first the priesthood was engrossed by the Patricians, but afterwards the people, disliking that preference, prevailed to have the priesthood divided between the senate and themselves; and under the tribuneship of Cn. Domitius, they gained the privilege of choosing the priests, which had been reserved for the college of Patricians; but in process of time a new regulation was adopted, so that the college became the electors, and the people confirmed that election. After some subsequent alterations, the emperors arrogated the right of choosing the priests, and became themselves the high-priests, which state of things commenced with Julius Cæsar. When the election of the college was confirmed by the people, they proceeded to the inauguration, which was performed with peculiar ceremonies, and concluded with an entertainment given by the new priests. From that moment they assumed the gown, called the "toga prætexta," and the ornament for the head, named "apex," "galerus," and "albo-galerus."

The priests in Rome enjoyed several privileges, and they might assist in the senate; but they were afterwards deprived of this privilege. They were exempt from burdensome offices in the state, and were disused from going to war. They had commonly a torch and a branch of laurel carried before them, and they were allowed to ride up to the Capitol in a chariot, called "Carpentum." Some were priests for life; others were deprived of it; but the augurs could not be deposed. Every order of priests had its peculiar college, and revenues for the sacrifices. In the order of the Roman Hierarchy, the pontiffs were the first. (See **PONTIFEX**.) Next to the Pontifex maximus were the Flamines; (see **FLAMEN**.) At Rome, as well as in Greece, there were sacerdotal families; those in that city were the "Potitii" and "Pindari" for the worship of Hercules, and that priesthood continued there a long time. The king-priest, or Rex Sacrificulus, was instituted after the expulsion of the kings of Rome, to perpetuate their memory, as Dionysius of Halicarnassus says, on account of the great services which some of their kings had done to Rome. To all these ministers we may add the "epulones." (See **EPULO**.) The Romans had also other orders of priests and priestesses, such as those that were instituted for keeping the "Sibylline" books, vestals, sibyls, falii, &c. which may be found under their proper titles.

The Jews had three orders, *viz.* priests, levites, and nephthimins, who served in the temple; over whom the high-priest was chief.

The title כֹּהֵנִים, *cohenim*, or priests, is applied in scripture to the officers of state as well as to the ministers of the sanctuary; though more commonly to the latter, who offered sacrifices, and in other ways officiated in the public worship. The true reason of the different application of the word seems to be, that in the primary sense it imports those that minister to a king; and, therefore, as God had taken upon himself the character of the king of Israel, he had his *cohenim* as well as earthly monarchs, or such as attended on his special presence in the sanctuary, and ministered in the sacred service.

The priestly office of Christ, says Dr. Doddridge in his "Lectures," has generally been explained, as executed in his offering himself as a sacrifice to God for us, and interceding with God upon that sacrifice; but Mr. Pierce (on Heb. v. 5, 6. viii. 4. note z), and most of the Socinians, suppose it only to consist in the latter; and Mr. Pierce argues from Heb. viii. 4. that the execution of it begun upon Christ's entering into heaven; but, it is alleged, that the text in question only proves that Christ, being of the tribe of Judah, could not, according to the Mosaic law, be

a priest to minister in the Jewish temple, which none can reasonably maintain that he was: compare Heb. vii. 4. Nevertheless, as the apostle assures us that he is a priest of a higher order, many divines have maintained, that all which he has done and suffered to make atonement for the sins of men, may, according to the most common acceptation of the word, be called a series of sacerdotal actions; as it is certain there were many acts of atonement performed by Mosaic priests, besides that which passed on the great days of atonement, and sacrifices were sometimes offered with acceptance by those who were not regularly priests. See Judges, vi. 25, 26. xiii. 16. 1 Kings, xviii. 33. 38.

When the Jewish constitution was settled, the public sacerdotal office was allotted to Aaron and his sons, and entailed on their posterity: and it was made a capital crime for any besides them to officiate, as priests, in the more solemn acts of offering sacrifices, burning incense, and blessing the people. The Jewish priests were consecrated to their office by washing, unction, enrobing them with the sacerdotal vestments, and offering certain sacrifices prescribed in the book of Exodus, chap. xxix.

The inferior priests were divided, in the time of David, into twenty-four companies, who were to serve in rotation, each company by itself for a week. The order in which the several courses were to serve was determined by lot; and each course was in all succeeding ages called by the name of its chief at the time of its first division.

The Mahometans have their priests called *scheik* and *mufti*; and the Indians and Chinese their *bramins* and *bonzes*. See MUFTI, and BRACHMAN.

PRIEST, *Presbyter*, in the *Christian Church*, is a person invested with holy orders; in virtue of which he has a power to preach, pray, administer the sacraments, &c.; and, in the Romish church also, to bless, absolve, &c.

By the canons, can. 34, a man must be twenty-four years of age before he be admitted to the priesthood; anciently thirty years were required.

And by 13 Eliz. cap. 12. and 44 Geo. III. c. 43. none shall be made minister, *i. e.* priest, being under the age of four and twenty years; and in this case there is no dispensation, as there is in that of a deacon: and unless he first bring to the bishop of the diocese a testimonial both of his honest life, and of his professing the doctrine expressed in the thirty-nine articles: nor unless he be able to answer, and render to the ordinary an account of his faith in Latin, according to the said articles, or have special gift or ability to be a preacher. And by the canon just cited, it is required, that he shall have taken some degree of school in either of the two universities, or, at least, be able to give an account of his faith in Latin, according to the thirty-nine articles; and also that he exhibit letters testimonial of his good life and conversation, under the seal of some college of Cambridge or Oxford, where before he remained, or of three or four grave ministers, together with the subscription and testimony of other credible persons, who have known his life and behaviour for the space of three years next before. Nor shall any bishop admit any person into sacred orders, which is not of his own diocese, except he be either of one of the universities of this realm, or except he shall bring letters dismissory from the bishop of whose diocese he is. By can. 33. none shall be admitted either deacon or priest, unless he is provided of some certain place where he may exercise his functions, and exhibit to the bishop, of whom he desireth imposition of hands, a presentation of himself to some ecclesiastical preferment then void in the diocese, &c. &c.

For other requisites, see DEACON. For the form of ordination, see ORDINATION.

The bishop, previous to ordination, shall minister to every candidate for orders, the oaths of allegiance and supremacy. (1 W. c. 8.) Then the bishop, with the priests present, shall lay their hands severally upon the head of every one that receiveth the order of priesthood, the receivers humbly kneeling upon their knees, and the bishop saying "receive the holy ghost for the office and work of a priest in the church of God, now committed unto thee by the imposition of our hands; whose sins thou dost forgive, they are forgiven; and whose sins thou dost retain, they are retained. And be thou a faithful dispenser of the word of God, and of his holy sacraments: in the name of the father, of the son, and of the holy ghost." Then the bishop shall deliver to every one of them kneeling, the bible in his hand, saying, "Take thou authority to preach the word of God, and to minister the holy sacraments in the congregation, where thou shalt be lawfully appointed thereunto." Nevertheless by can. 36: he may not preach without a licence either of the archbishop, or of the bishop of the diocese where he is placed, under their hands and seals, or of one of the two universities under their seals likewise. But a licence of the bishop of any diocese is sufficient, although it be only to preach within his diocese; the statute not requiring any licence by the bishop of the diocese where the church is. Watf. c. 14.

The holy scripture makes no distinction between the title of priest, presbyter, and that of bishop, *episcopus*; and does not give any superiority to the one over the other. Blondel, therefore, and Salmalius maintain, with good reason, that in the primitive church the priests governed with perfect equality, and without any other pre-eminence beside that of age.

Yet some of the primitive writers speak of nothing but episcopacy; and frequently in such terms, as if they esteemed it of apostolical institution. See BISHOP, ORDINATION, and PRESBYTER.

As, in the ancient church, the deacons had the management and administration of the revenues of the church, their authority grew apace; and, in a little time, they were got above the priests. St. Jerom used his utmost endeavours to prove, that deacons were originally inferior to priests; and the council of Nice decided the question in favour of the latter. See DEACON.

Indeed, an order of deacons having been instituted without any other function than to assist the priest at the altar; these have made no difficulty of owning the superiority of the priests.

Add to this, that the order of a deacon being now become necessary to arrive at that of a priest, there is no room to dispute the precedency; but the deacons, who had retained their function, had the disposal of the revenues, and paid the priests their pensions, still maintained the superiority. Upon which the sixth council in Trullo pronounced once more on the dispute, and gave the pre-eminence to the priests.

In the general acceptation of the word, priests are any ministers of a church; but in our law this word is particularly used for ministers of the church of Rome. For the laws against popish priests, see PAPISTS.

PRIEST, *Arch.* See ARCH-PRIEST.

PRIEST, *Cardinal.* See CARDINAL.

PRIESTS, *College of.* See PONTIFICAL College.

PRIEST, *Hgh.* See PONTIFEX.

PRIEST, *Regular.* See REGULAR.

PRIEST of the Oratory. See ORATORY.

PRIEST'S Cap, in *Fortification*. See BONNET à pretre.

PRIEST'S Pintle, in *Botany*. See WAKE Robin.

PRIESTHOLM, in *Geography*, a small island in the Irish sea, near the N.E. coast of the island of Anglesey. It was formerly the residence of a priory of black monks; 5 miles N.E. of Beaumaris.

PRIESTLEY, JOSEPH, in *Biography*, a very eminent philosopher and divine, was born in March 1733, at Field-Head, near Leeds. His father was engaged in the clothing manufacture, and was a dissenter of the Calvinistic persuasion. Joseph was, in his youth, adopted by an aunt, who sent him for education to several schools in the neighbourhood, where he acquired a respectable degree of knowledge of the learned languages, including Hebrew. He was intended for the ministry among the dissenters; and in 1752 he went to the academy at Daventry, kept by Dr. Ashworth, having by ill health been prevented from pursuing his academical course at an earlier period. Here he spent three years, during which his acute and vigorous mind was expanding in free inquiry and diversified pursuit. He had already abandoned the doctrines in which he had been educated, and had become an Arian. At Daventry he became acquainted with the writings of Hartley, which exerted a powerful and lasting influence over the whole train of his thinking. On quitting the academy, he settled at Needham market, in Suffolk, as a minister, and, after a residence of three years, he undertook the charge of a congregation at Nantwich, in Cheshire, to which he joined the business of a school. In the business of education he was indefatigable; and he added to the common objects of instruction, experiments in natural philosophy, which were the means of fostering in himself a taste for pursuits of this kind. His first publication was an English grammar, on a new plan. This was printed in 1761, and in the same year he was invited by the trustees of the academy at Warrington to occupy the post of tutor in the languages. At Warrington Dr. Priestley began to distinguish himself as a writer in various branches of literature. Several of these had relation to his department in the academy, which, besides philology, included lectures on history and general policy. A visit to London having introduced him to the acquaintance of Dr. Franklin, Dr. Watson, Dr. Price, and Mr. Canton, he was encouraged by them to pursue a plan which he had already formed, of writing a history of electricity, which appeared in the year 1767. This publication made his name extensively known among those who might have remained strangers to it, as connected with his other pursuits. It went through several editions, and was translated into foreign languages, and procured for him an admission into the Royal Society. He had previously received the title of doctor of laws from the university of Edinburgh. He quitted Warrington in 1767, and settled at Leeds as minister to a large congregation of dissenters, and he instantly resumed, with his characteristic ardour, his theological studies. He about this time became an Unitarian in the strict sense of the word, that is, a believer in the simple humanity of Christ, a circumstance which he has attributed to a perusal of Dr. Lardner's "Letter on the Logos." A number of publications on different topics connected with religion, announced the zeal with which he was inspired. He likewise began to enter into a controversy respecting the right and ground of dissent in general, and to take his station as one of the most decided opposers of the authority of the established religion. It was during his residence at Leeds that his attention was first excited, in consequence of his vicinity to a public brewery, to the properties of fixed air, which he had an opportunity of

obtaining on a large scale. One experiment led to another, till the fruits of his amusements were the discoveries on which his philosophical reputation was principally founded. Though he greatly enlarged the boundaries of science, he was never vain of his discoveries. In speaking of himself, he says, "Few persons, I believe, have met with so much unexpected good success as myself in the course of my philosophical pursuits. My narrative will shew that the first hints, at least, of almost every thing that I have discovered of much importance, have occurred to me in this way. In looking for one thing, I have generally found another, and sometimes a thing of much more value than that which I was in quest of. But none of these unexpected discoveries appear to me to have been so extraordinary, as that I am about to relate, viz. the spontaneous emission of dephlogisticated air from water containing green vegetating matter, and it may serve to admonish all persons who are engaged in similar pursuits, not to overlook any circumstance relating to an experiment, but to keep their eyes open to every new appearance, and to give due attention to it, however inconsiderable it may seem."

The first of Dr. Priestley's publications on pneumatic chemistry was in 1772, announcing a method of impregnating water with fixed air; and on the preparation and medicinal uses of artificial mineral waters. He had, however, commenced his experiments on this subject as early as 1768. In the year 1771 he had procured good air from saltpetre; he had discovered the uses of agitation and of vegetation as means employed by nature in purifying the atmosphere destined to the support of animal life; and that air vitiated by animal respiration is a pabulum to vegetable life. Dr. Priestley had also procured factitious air in a much greater variety of ways than had been known before, and he had been in the habit of using mercury instead of water for the purpose of many of his experiments. In his paper read to the Royal Society in 1772, which obtained the Copley medal, he gave an account of these discoveries; and at the same time announced the discovery of nitrous air, and its application as a test of the purity or fitness for respiration of airs generally. It was on this occasion that sir John Pringle addressed him in the eloquent language of an admiring friend. "I present you, sir, with this medal, the palm and laurel of this community; as a faithful and unfading testimonial of their regard, and of the just sense they have of your merit, and of the persevering industry with which you have promoted the views, and thereby the honour of this Society. And in their behalf I must earnestly request you to continue your liberal and valuable inquiries, whether by farther prosecuting this subject, probably not yet exhausted, or by investigating the nature of some other of the subtle fluids of the universe. These, sir, are indeed large demands; but the Royal Society have hitherto been fortunate in their pneumatic researches. And were it otherwise, they have much to hope from men of your talents and application, and whose past labours have been crowned with so much success."

Dr. Priestley, at this period, shewed the use of the burning lens in pneumatic experiments; he related the discovery and properties of muriatic acid air; added much to what was known of the airs generated by putrefactive processes, and by vegetable fermentation; and he determined many facts relating to the diminution and deterioration of air, by the combustion of charcoal, and the calcination of metal. In 1774 he made a full discovery of dephlogisticated air, which he procured from the oxyds of silver and lead. This hitherto secret source of animal life and animal heat,

of which Mayow had a faint glimpse, was unquestionably first exhibited by Dr. Priestley, though it was discovered about the same time by Mr. Scheele of Sweden. In 1776, his observations on respiration were read before the Royal Society, in which he discovered that the common air inspired was diminished in quantity, and deteriorated in quality, by the action of the blood on it through the blood-vessels of the lungs; and that the florid red colour of arterial blood was communicated by the contact of air through the containing vessels. In 1778 Dr. Priestley pursued his experiments on the properties of vegetables growing in the light to correct impure air, and the use of vegetation in this part of the economy of nature; and it seems certain that Dr. Priestley made his discoveries on the subject previously to those of Dr. Ingenhousz, then engaged in similar researches. From this period Dr. Priestley seems to have attended to his pneumatic experiments as an occupation, devoting to them a regular portion of his time. To this attention, among a prodigious variety of facts tending to shew the various substances from which gases may be procured, the methods of producing them, their influence on each other, and their probable composition, we owe the discovery of vitriolic acid air, of alkaline air, and of dephlogisticated nitrous air; or, as it has since been denominated, the gaseous oxyd of azote, the subject of so many curious and interesting experiments by sir Humphry Davy. To these may be added the production of various kinds of inflammable air, by numerous processes that had escaped the observation of Mr. Cavendish. To Dr. Priestley we are indebted for that fine experiment of reviving metallic calces in inflammable air; and he first ascertained the necessity for water to be present in the formation of the gases, and the endless production of gases from water itself. His experiments on this subject, *viz.* the generation of air from water, opened a new field for reflection, and deserve particular notice. It had been already remarked that water was necessary to the generation of every species of gas; but the unceasing product of air from water had been observed by no one before.

“To enumerate,” says Mr. Kirwan, “Dr. Priestley’s discoveries, would in fact be to enter into a detail of most of those that have been made within the last fifteen years. How many invisible fluids, whose existence evaded the sagacity of foregoing ages, has he made known to us? The very air we breathe he has taught us to analyse, to examine, to improve: a substance so little known, that even the precise effect of respiration was an enigma, until he explained it. He first made known to us the proper food of vegetables, and in what the difference between these and animal substances consisted. To him pharmacy is indebted for the method of making artificial mineral waters, as well as for a shorter method of preparing other medicines; metallurgy for more powerful and cheap solvents; and chemistry for such a variety of discoveries as it would be tedious to recite,—discoveries which have new-modelled that science, and drawn to it, and to this country, the attention of all Europe. It is certain that, since the year 1773, the eyes and regards of all the learned bodies in Europe have been directed to this country by his means. In every philosophical treatise his name is to be found, and in almost every page. They all own that most of their discoveries are due either to the repetition of his discoveries, or to the hints scattered through his works.”

To return to the more general account of Dr. Priestley’s labours:—the success of his “History of Electricity” induced him to adopt the design of treating on other sciences, in the same historical manner; and at Leeds he occupied

himself in preparing “The History and present State of Discoveries relating to Vision, Light, and Colours.” The expences necessary in composing such a work obliged him to issue proposals for publishing it by subscription; and it appeared in 1772, in one very large volume, 4to. This work is at once highly instructive and entertaining; but its sale by no means corresponded with the expectations formed from the number of names given in as subscribers: it has been said, not one-third part of the number paid for, or demanded the book when it was published.

After a happy residence at Leeds for six years, Dr. Priestley quitted it for one as different as could easily be imagined. The earl of Shelburne, afterwards marquis of Lansdowne, invited Dr. Priestley to reside with him in the nominal capacity of librarian, but really as his literary companion, upon terms which a regard to the future provision of an increasing family would not permit him to decline. He accordingly fixed his family in a house at Calne, in Wiltshire, near his lordship’s seat; and during seven years attended upon the noble earl, in his winter’s residences at London, and occasionally in his excursions, one of which, in 1774, was a tour to the continent. This situation had doubtless its use, by affording Dr. Priestley advantages in improving his knowledge of the world, and in pursuing his scientific researches, which he could not have enjoyed as a dissenting minister. The manners and society of a nobleman’s house were not, however, perfectly congenial to one whose tastes were simple, and whose address was plain and unceremonious. But he was perfectly free from restraint with respect to his pursuits; and this was the period of some of those exertions to which we have referred above, which raised his reputation as a philosopher to the highest point. It was his constant practice to employ himself in various pursuits at the same time, whereby he avoided the languor consequent upon protracted attention to a single object, and came to each in turn as fresh as if he had spent an interval of entire relaxation. This effect he pleaded as his apology, to those who apprehended that the great diversity of his studies would prevent him from exerting all the force of his mind upon any one of them; and it is certain, he proceeded to such a length, in every pursuit that interested him, as fully to justify in his own case the rule which he followed.

It was during a course of original experiments, which fully exercised his faculties of invention and observation, that he was employing his reasoning powers in those deep metaphysical inquiries, by which he acquired great distinction as a philosopher of another class. In the year 1775 he published his “Examination of the Doctrine of Common Sense, as held by Drs. Reid, Beattie, and Oswald.” After this he became the illustrator of the Hartleian theory of the human mind. He had, previously to this, declared himself a believer in the doctrine of philosophical necessity; and in a dissertation prefixed to his edition of Hartley, he expressed some doubts of the immateriality of the sentient principle in man. Notwithstanding the obloquy thus brought upon him, as a favourer of infidelity, or, according to some bigots, of atheism itself, he was not deterred from pursuing the subject: for it was the governing principle of his life to follow truth whithersoever it might lead him, and regardless of consequences. Upon closer inquiry, he became an entire convert to the material doctrine, or that of the homogeneity of man’s nature; and in 1777 he published “Disquisitions on Matter and Spirit;” in which he gave a history of the doctrines concerning the soul, and openly supported the system which, upon due investigation, he had adopted. It was followed by “A Defence of Unitarianism,

tarianism, or the simple Humanity of Christ, in opposition to his Pre-existence; and of the Doctrine of Necessity." Dr. Aikin, in the General Biography, thinks it probable that the odium which these works brought upon their author was the cause of a coolness in the behaviour of his noble patron, which about this time he began to remark, and which terminated in a separation, after a connection of seven years, without any alleged complaint. The parties themselves, no doubt, well knew the cause of this separation; but it seems to have been a settled point between them, that there should be no public complainings, and that the separation should *apparently* be on amicable terms. That the separation was not really what it appeared to be is evident, as the doctor informs us, that when he came to London, he proposed to call on the noble lord; but the latter declined receiving his visits. Dr. Priestley tells us, that during his connection with his lordship, he never once aided him in his political views, nor ever wrote a single political paragraph. We can easily believe, that after a few years, the parade of having under his roof a literary companion would lose its effect, and the desire of change would induce lord Shelburne to break a connection, which proved of no real use to him. By the articles of agreement, Dr. Priestley retained an annuity for life of 150*l.*, which was honourably paid to the last; and it has been said, that when the bond securing to him this annuity was burnt at the riots of Birmingham, his lordship in the handsomest manner presented him with another.

Dr. Priestley now removed to Birmingham, a situation which he probably preferred to almost any other, on account of the advantage it afforded of able workmen in every branch requisite in his experimental inquiries, and of some men distinguished for their chemical and mechanical knowledge. Several noble-hearted friends to science, aware that the defalcation of his income would render the expences of his pursuits too burthenfome for him to support, joined in raising an annual subscription for defraying them. This assistance he without hesitation accepted, considering it as more truly honourable to himself than a pension from the crown, which might have been obtained for him, if he had wished it, during the short administration of the marquis of Rockingham, and the early part of that of Mr. Pitt.

He had not been long settled at Birmingham, before a vacancy happened in the principal dissenting congregation, and he was unanimously chosen to supply it. Without in the least interrupting his philosophical and literary pursuits, he entered with great zeal into the duties of his office, especially into that important branch of it which consists in catechising and instructing the younger members of the society. Theology again occupied a principal share of his attention, and he published his "History of the Corruptions of Christians," and "History of early Opinions concerning Jesus Christ." These proved to be, what might be expected, a fertile source of controversy, into which he entered without the smallest reluctance, and without those uneasy feelings of irritation which so commonly accompany this kind of warfare. The renewed applications of the dissenters, for relief from the penalties and disabilities of the Corporation and Test Acts, afforded another topic of discussion, in which Dr. Priestley took an active part; and convinced that all ecclesiastical establishments were hostile to the rights of private judgment, and the propagation of truth, he did not scruple to represent them all as anti-christian, and predict their downfall. Hence he was represented as the most dangerous and inveterate enemy of the established religion, in its connection with the state. Some of the clergy of Birmingham having warmly opposed the dissenters'

claims, Dr. Priestley published a series of "Familiar Letters to the Inhabitants of Birmingham," which, on account of their ironical manner, as well as the matter, gave great offence. In this state of irritation, another cause of animosity was added by the different feelings concerning that great event, the *French Revolution*; which see. The anniversary of the capture of the Bastille, July 14th, had been kept as a festival by the friends of the cause; and its celebration was prepared at Birmingham in 1791. Dr. Priestley declined joining the party; but in the popular tumult which ensued, he was particularly the object of party fury. His house, with his fine library, manuscripts, and apparatus, were made a prey to the flames. He was obliged to fly for his life. The interesting narrative which he has given of the circumstances of his escape, shews that it was extremely difficult for him to reach a place of safety, while, without the slightest charge against him, he was hunted like a proclaimed criminal. There is no doubt that this scene of outrage, attended with the conflagration of many other houses, and places of worship, was rather favoured than controlled by some, whose duty ought to have led them to active interference for the preservation of the public peace. Nor is it at all surprising that the rage of party was especially directed against one, who had so distinguished himself as a champion on the opposite side, and who had made his attacks without any regard to the dictates of caution or worldly policy. The legal compensation for which, by the advice of his friends, he sued, was far short of the amount of his losses. He was not, however, without his friends, whose zeal for his welfare was not the least damped by the bitterness and malignity of his enemies. They looked upon him with a respect and affection proportioned to his sufferings, and exerted themselves to support and console him under this trying calamity. He now settled at Hackney, and in a very short time he was chosen to succeed his deceased friend, Dr. Price, as minister to a congregation at Hackney; and he joined to it a connection, of a very restricted nature, with the New College, lately established in that village. Resuming his usual occupations of every kind, he passed sometime in comfort and tranquillity; but he soon found public prejudice following him in every path, and himself and his family molested by the rude assaults of malignity, which induced him finally to quit a country so hostile to his person and principles. He accordingly, in the month of April 1794, embarked for America, and took up his residence at the town of Northumberland, in Pennsylvania. It was a considerable labour, in this remote situation, to get a well-furnished library and chemical laboratory; but he at length surmounted all obstacles, and effected his purpose. He was offered a chemical professorship in Philadelphia, which he declined, not meaning to engage in any public duty, in order that he might be enabled to devote his whole time to his accustomed pursuits, in which he soon shewed his philosophical friends that he was not idle. Political animosity, in some measure, pursued him to the western world; and during the administration of Mr. Adams, he was regarded by the American government with suspicion and dislike. That of Mr. Jefferson, however, was very friendly to him, and he outlived all disquiet on this head. The death of his youngest son, a very promising young man, and of his excellent wife, together with other domestic calamities, were severe trials of his fortitude. A severe illness, which he suffered in Philadelphia, laid the foundation of a debility of his digestive organs, which gradually brought on a state of bodily weakness, while his mind continued in full possession of all its faculties. In January 1804, it became manifest to himself, and to his friends, that he had not long to live; and

and this warning operated upon him to lose no time in finishing the literary tasks in which he was engaged, and particularly in putting into a state fit for the press some works in which he was greatly interested. He had prepared a continuation of his Church History, and Notes on all the Books in the Bible; and had learned with great satisfaction, that his friends in England had raised a subscription, to enable him to print them without any risk to himself. Like a man, then, setting his affairs in order, previously to a long journey, he continued, to the last hour of his life, with the utmost calmness and self-collection, giving directions relative to his posthumous publications, intermixed with discourses expressive of the fullest confidence in those cheering and animating views of a future existence, that the Christian religion opened to its disciples; and on Feb. 6, 1804, in the 71st year of his age, he expired so quietly, that they who sat beside him did not perceive the last moment of his existence. As if aware the solemn moment was at hand, and unwilling to shock his children, who were sitting by his bed-side, by his departure, he had taken the precaution of putting his hand before his face.

“Dr. Priestley was a man of perfect simplicity of character, laying open his whole mind and purposes on all occasions, and always pursuing avowed ends by direct means, and by those only. In integrity and true disinterestedness, and in the performance of every social duty, no one could surpass him. His temper was easy and cheerful, his affections were kind, his dispositions friendly. Such was the gentleness and sweetness of his manner in social intercourse, that some who had entertained the strongest prejudices against him on account of his opinions, were converted into friends on personal acquaintance. Of the warm and lasting attachment of his more intimate friends, a most honourable proof was given, which he did not live to be made acquainted with. It being understood in England that he was likely to suffer a loss of 200*l.* in his annual income, about forty persons joined in making up a sum of 450*l.* which it was intended to be continued annually during life. No man who engaged so much in controversy, and suffered so much from malignity, was ever more void of ill-will towards his opponents. If he were an eager controversialist, it was because he was much in earnest on all subjects in which he engaged, and not because he had any personalities to gratify. If now and then he betrayed a little contempt for adversaries, whom he thought equally arrogant and incapable, he never used the language of animosity. Indeed his *Necessarian* principles coincided with his temper in producing a kind of apathy to the rancour and abuse of antagonists. In his intellectual frame were combined quickness, activity, acuteness, and that inventive faculty which is the characteristic of genius. These qualities were less suited to the laborious investigations of what is termed erudition, than the argumentative deductions of metaphysics, and the experimental researches of natural philosophy. Assiduous study had, however, given him a familiarity with the learned languages sufficient, in general, to render the sense of authors clear to him, and he aimed at nothing more. In his own language he was contented with facility and perspicuity of expression, in which he remarkably excelled.”

The writings of Dr. Priestley, amounting probably to seventy volumes 8vo., are too numerous to attempt any thing like an analysis of them. They have been classed in those that relate to general philosophy, pneumatic chemistry, metaphysics, civil liberty, religious liberty, ecclesiastical history, evidences of the Christian revelation, defences of unitarianism, miscellaneous theology, miscellaneous literature. Of what Dr. Priestley did in chemistry we have given a

sketch. We may, however, add in this place, that he remained to the end of his life attached to the phlogistic theory which he had imbibed, and which the French chemists thought they had completely demolished. It is more than possible that a new change in the opinions of chemists may take place on this important subject. (See PHLOGISTON.) Some of Dr. Priestley's writings of this class were attacks upon the antiphlogistic theory, of which he lived to be the sole eminent opposer.

On the science of metaphysics he was the strenuous advocate of Dr. Hartley's theory of association, upon which he founded the systems of materialism and necessity as legitimate inferences. No writer has treated these abstruse subjects with more acuteness and perspicuity, and so long as they are topics of discussion, his writings will probably be considered as the ablest elucidations and defences of the theories proposed in them. In theology, Dr. Priestley was a great leader of those who regard Jesus Christ as the son of Joseph and Mary, divinely commissioned to reveal to the world a future state of existence. He of course did not admit into his creed a miraculous conception; nor an atonement made by Christ to render the Almighty merciful to the errors of men. He founded all his expectations of a future life upon revelation alone, and he believed that punishment beyond the grave was intended to render the subject of it meet for endless happiness, to which all rational beings would finally be brought. One of his most important theological works is entitled “*Institutes of natural and revealed Religion.*” His “*Letters to a philosophical Unbeliever*” deserve also attention. Among his pieces on practical religion may be named, as of very singular excellence, “*Two Sermons on Habitual Devotion, and on the Duty of not living to ourselves:*” these have very frequently been reprinted, and many thousands of them circulated in a cheap form. *Memoirs of Dr. Joseph Priestley in two vols. 8vo. Gen. Biog.*

PRIETCHE, in *Geography*, a town of Brandenburg, in the Middle Mark; four miles S.E. of Brandenburg.

PRILIPO, a range of mountains of European Turkey, in Macedonia, about 12 miles W. of the river Vardar.—Also, a town of Macedonia; 20 miles N.N.W. of Stobi.

PRILUKI, a town of Russia, in the government of Ekaterinoslav; 52 miles S.W. of Elisabet.—Also, a town of Russia, in the government of Tchernigov; 100 miles S.E. of Tchernigov. N. lat. 51° 3'. E. long. 32° 44'.

PRILUTSKOI, a town of Russia, in the government of Archangel, on the Dwina; 28 miles E. of Schenkursk.—Also, a town of Russia, in the province of Usting, on the Dwina; 20 miles N. of Usting.

PRIM, a river of Arabia, which runs into the sea; 18 miles S.W. of Ras Vive.

PRIMA INTENSIONE, a technical expression in *Music*, as well as *Painting*. No language but the Italian seems to furnish an equivalent to this expression. Rousseau has endeavoured, with his usual good taste and ingenuity, to explain it. We shall, therefore, only translate.

An air or movement *di prima intensione*, or of first conception, is that which is formed entire in all its parts at one and the same instant, as Pallas proceeded from the brain of Jupiter.

These pieces of one conception, are those rare effusions of genius in which all the ideas are so combined that they seem to be but one, and appear as if they could not be conceived separately. They resemble those long but eloquent periods of Cicero, of which the sense is suspended to the last word, and which consequently could have formed but one thought in the mind of the author. There are in all the

arts similar beauties produced by similar efforts of genius, and of which all the details intimately connected with each other could not be produced successively; but are necessarily presented to the mind all at once; since the first without the last would have no effect. Such was, for instance, the stocking loom, that prodigious machine, which may be regarded, says the philosopher who described it in the Encyclopédie, as one sole and only act of reason, of which the fabrication of the work is the conclusion.

These kinds of operations in the human mind, so difficult to explain, even by analysis, are prodigies of reason, and never conceived but by men of such genius as are able to produce them. Their effect is always proportioned to the effort which they have cost the brain. And in music, it is only the pieces of *one conception*, that give extacy, rapture, lift the souls of the audience into Elysium, and make them forget themselves, and all that is around them. They are felt and divined at the instant; connoisseurs are never mistaken.

After one of these sublime productions, let one of those pieces of shreds and patches be performed, of which all the phrases have been composed one after the other, or which have only one phrase repeated through all the keys, and of which the accompaniment is only a crowd of unmeaning notes added by reflection after the original idea is forgotten; but in whatever style this last piece is composed, if the remembrance of the other leaves you any inclination to listen, it will be only to render you chill, tired, and impatient. After an air *di prima intensione*, all other music is without effect.

PRIMA Naturalia, in *Physics*, atoms, or the first particles of which natural bodies are primarily composed; called also MINIMA Naturalia, which see; see also PARTICLE, and ATOM.

PRIMA Tria, in *Chemistry*. See TRIA.

PRIMÆ, or *Primariæ Preces*, in *Law*. See PRECES.

PRIMÆ Viæ, a term employed chiefly in medicine, to denote the stomach and intestines, or passages of the food.

PRIMAGE, a duty at the water-side, appointed by a statute of Henry VIII. to be paid to the master and mariners of the ship, by the merchants whose goods are loaded or unloaded.

It is paid to the master for the use of his cables and ropes, in moving the goods; and to the mariners for their service and assistance.

This is different in different places; in some 12*d.* per ton; in others, a penny per pound; in others, sixpence per bale or pack. See DUTY, and CUSTOM.

PRIMARY PLANET, a planet which revolves round the sun as a centre.

PRIMARY Affections, collateral points, dials, motion, place, and qualities. See the substantives.

PRIMATE, PRIMAS, an archbishop, invested with a jurisdiction over several archbishops, or bishops.

The term primate is Latin, and signifies the first, or president of a society: the Greek word corresponding to it is ἐξάρχης, *exarch*.

Father Sirmond derives the origin of primates hence: that the large provinces have been divided and subdivided by the emperors; the first divisions were called firsts; others seconds; others thirds, &c. and the title primate given to the metropolitan, *i. e.* to the bishop of the city which was the capital of the province before the division was made. As metropolitan was a title given to the bishop of the chief city of a province, primate, or primas, was the first of the province; for such was the original signification of that

word in an ecclesiastical sense: but in process of time, the title of primate was restrained to the bishops of some great cities: and a patriarch was the chief bishop over several kingdoms or provinces, as an archbishop is of several dioceses.

Those who are advocates for a strict ecclesiastic hierarchy, maintain a primate to be a dignity who has several metropolitans under him; as a patriarch has several primates. Yet it is pretty evident from history, that primates were, at first, confounded with patriarchs: thus Socrates, enumerating ten patriarchs, does not make any distinction between them and primates.

In Africa, after the distinction was made, the primates were not at all subject to the patriarch: thus the bishop of Carthage, who was primate, paid no obedience to the bishop of Alexandria, who was patriarch.

Nor, to be a primate, was it necessary to have metropolitans for suffragans; each province of Africa, except those which composed the diocese of Alexandria, had its primate; this quality being given to age.

In France, the subdivision of provinces gave occasion to the erection of primates: thus Aquitaine, *e. gr.* being divided into two provinces, the archbishop of Bourges became primate of the Aquitaines, because Bourges was the capital of the first.

Thus, also, the division of England into two provinces, Canterbury and York, in 1152, gave occasion to the introduction of primacies among us; Canterbury, which was the metropolis before, or the royal city of the kings of Kent, and given to king Ethelbert, on his conversion to Christianity, by Austin, its first archbishop, about the year of our Lord 598; thence giving the title of *primate of all England* to its prelate, though the archbishop of York still claims that of *primate of England*. And, accordingly, the first has some jurisdiction over all England, relating to administrations, &c. which the latter has only within his own province. See ARCHBISHOP, BISHOP, and DIOCESE.

PRIMATES, in *Natural History*, the first order of the class Mammalia, according to the Linnæan system. The animals of this order are furnished with cutting *fore-teeth*; the upper four are parallel, except in some species of bats, which have two or none (see VESPERTILIO *nigrita*, *lepturus*, &c.); tusks solitary, that is, one on each side, in each jaw; teats two, pectoral; feet, two of which are hands; nails usually flattened, oval; food, fruits, except a few who use animal food. There are four genera, *viz.*

Homo,
Lemur,
Simia, and
Vespertilio.

PRIMATICCIO, FRANCESCO, in *Biography*, was born at Bologna, in 1490, of a noble family. It was intended that he should be bred up to commerce, but having too elevated a mind to adopt that occupation, and prompted by natural genius, he devoted himself to the arts of design, and began to learn design and colouring from Innocenzio da Imola, and Bagnacavallo; and in a short time was enabled, by his incessant industry, to give manifest proofs of extraordinary talents. He then quitted his native city, and went to Mantua, where he became a disciple of Julio Romano, who at that time was engaged in ornamenting the apartments of the palace del Te, assisted by a number of young artists who had received their instruction in his school. Primiticcio continued under Julio for six years, and became a great machinist, an artist in fresco, stucco, and every branch of classic or magnificent ornament.

He effectually established himself in the favour of his master,

master, and of the duke of Mantua; and was recommended in the strongest terms by that prince to Francis I., who immediately took him into his service, and appointed him to execute a great number of his designs in fresco and in oil. Not less fortunate and successful with the king than he had been with the duke, his works were improved and admired; and he adorned Fontainebleau, and most of the royal palaces in France, with his compositions.

At the time that Primaticcio was engaged by Francis, Rosso, a Florentine painter, was also retained and employed. Between these two artists a violent rivalry and jealousy subsisted; but the king, to quiet their dissensions, sent the former to Rome to purchase antiques. He executed his commission very happily; and in a short time collected a hundred and twenty-five statues, busts, and mutilated figures: and procured moulds of the most celebrated statues which were not to be purchased, such as the Laocoon, the Tiber and Nile, the Ariadne, Commodus, and others, which were cast in brass.

He was recalled from Rome to finish a large gallery, left incomplete by Rosso at his death; and the king, to express his esteem for Primaticcio, and his public approbation of his merit, conferred on him the abbey of St. Martin, at Troyes, with the annual income of 800 crowns; which he enjoyed as long as he lived.

The frescoes of Primaticcio, in the palace del Te, cannot with certainty be ascertained. His oil pictures are of the utmost rarity in Italy, and even at Bologna. In the great gallery Zambeccari, there is a concert by him with three female figures, a most enchanting performance. The eye is equally charmed by the forms, the attitudes, the tone of colour, the breadth, taste and ease of the draperies, and the original air of the whole. Nicolo Abbati, the partner of his works, though not his scholar, was left by him to terminate what was left unfinished of his plans in France. Primaticcio lived to the advanced age of eighty, and died in 1570. Fufeli's Pilkington.

PRIMAVERA, GIO. LEONARDO, a Neapolitan poet and musician, surnamed *dell' Arpa*, who published at Naples, in 1570, three books of songs, *alla Napoletana*.

PRIMBKENAU, in *Geography*, a town of Silesia, in the principality of Glogau, containing two churches, with an iron forge, and manufacture of paper; 10 miles E. of Sprottau. N. lat. $51^{\circ} 28'$. E. long. $15^{\circ} 46'$.

PRIME, PRIMUS, the first in order, degree, or dignity, among several things of the same or like kind.

Thus we say, prime minister, prime mover, prime cost, &c. See MINISTER, MOBILE, &c.

PRIME, or *Prime minute*, in *Geometry*, denotes the sixtieth part of a degree.

PRIME is sometimes also used for a tenth part of an unit. See DECIMAL.

In weights, it is used for the twenty-fourth part of a grain.

PRIME Figure, in *Geometry*, is that which cannot be divided into any other figures more simple than itself.

Such is a triangle among planes; and the pyramids in solids. For all planes are made of the first, and all bodies or solids are compounded of the second.

PRIME Number, in *Arithmetic*, is one which has no divisors, or which cannot be divided into any number of equal integral parts greater than unity: such are the numbers 2, 3, 5, 7, 11, 13, &c.

These numbers have formed a subject of investigation and inquiry, from the earliest traces of arithmetic to the present time; either with a view of finding them, or selecting them

from the common series of numbers, or for investigating certain properties which are peculiar to them.

Eratosthenes is the first author amongst the ancients who attempted the former problem, which led him to the invention of what he called his *κοκκινον*, or *sieve*; by which he excluded from the general series those that were composite, and consequently the remaining numbers were prime.

The principle of this method consisted, first, in writing down every odd number from 1 to any extent proposed, and then pointing off every 3d, 5th, 7th, &c. numbers, each of which would necessarily be composite, and those which remained without points prime numbers. Let there be written, for example, the following series:

1	3	5	7	9	11	13	15	17	19
·21	23	·25	·27	29	·31	·33	·35	·37	·39
41	·43	·45	47	·49	·51	53	·55	·57	59
61	·63	·65	67	·69	71	73	·75	·77	79
81	83	·85	·87	89	·91	·93	·95	97	·99

We begin with the first prime number 3, and over every third number from 3 a point is placed; each of these numbers being divisible by 3, as 9, 15, 21, &c.

Then from 5, a point is placed over every fifth number; these being divisible by 5, as 15, 25, 35, &c. Again, from 7, every seventh number is pointed in the same manner, such as 21, 35, 49, &c. And having done this, all that remain without points in the above series are primes; for there is no prime number between 7 and $\sqrt{100}$: and it is useless trying any prime number greater than the square root of the number proposed, which we have supposed here to be 100. Adding, therefore, to the above the prime number 2, which is the only *even* prime number, and we shall have,

2,	3,	5,	7,	11,	13,	17,	19,	23,
29,	31,	37,	41,	43,	47,	53,	59,	61,
67,	71,	73,	79,	83,	89,	97,		

which are the only prime numbers under 100.

Such was the method pursued by Eratosthenes, and the same, aided probably by some mechanical contrivance, has been adopted by modern authors. Of these, Vega has published a table of prime numbers to 400,000; and a work lately published in Holland, not only contains the prime numbers up to 1,000,000, but also the factors of all composite numbers to the same extent; a performance which, it must be allowed, displays the industry of its author to much more advantage than either his genius or judgment.

It is obvious from what is stated above, that this method cannot be employed for ascertaining whether any proposed number be a prime, without going through the whole process up to the same extent; the *desideratum*, therefore, of modern mathematicians has been to discover some rule, whereby any proposed number may be determined to be a prime or composite number; in which, however, they have not succeeded. Others, again, have endeavoured to find some formula, as $x + x + 41$, $x^2 + x + 17$, $2x^2 + 29$, &c. which shall contain prime numbers only, whatever value may be given to x ; but neither in this have they been more successful. It is in fact demonstrable, that no such formula can be found; though some formulæ of this kind are remarkable for the number of primes included in them. Thus the first of those given above, by making successively $x = 0, 1, 2, 3, \&c.$ will give a series, the first *forty* terms of which are prime numbers; the second, in the same way, gives *seventeen* of its first terms prime; and the latter,

twenty-nine. These cases shew the great danger of inductive conclusions in mathematical investigations; for it will seldom happen that we have greater reason to draw a general conclusion, on those principles, than in the series above mentioned.

It was doubtless by not being sufficiently guarded on this point, that led Fermat, the father of the present theory of numbers, to assert that $2^x + 1$ would always be a prime number, while x was taken any term in the series, 1, 2, 2^2 , 2^3 , &c.; but Euler found that it failed in the case $x = 32$, which gives $2^{32} + 1 = 641 \times 6700417$.

It may not be amiss to observe, with respect to what is stated above, *viz.* that no rule has yet been found for ascertaining whether a given number be prime or not; that this is only meant with reference to a ready method: for, in fact, if we divide a number successively by all prime numbers less than the square root of itself, and no one of them will divide it without a remainder, that number is a prime, which, though long and tedious, may be called a rule for that purpose: there are also other rules depending upon the quadratic forms of prime numbers, but they are all extremely laborious for large numbers. Waring, in his "Meditationes Algebraicæ," gives also a rule for this purpose, which he informs us is due to sir John Wilson, and which, considered *in abstracto*, is certainly as complete as can be desired. This is as follows:

If n be a prime number, then the continued product (1. 2. 3. 4. 5. &c. $n - 1$) + 1, will be divisible by n .

And as this property belongs exclusively to prime numbers, nothing can be more complete; but unfortunately the great magnitude of the product renders it totally useless as a practical rule.

The curiosity of the public has been lately much excited by the little American boy, Zerah Colburn, (already mentioned under our article MNEMONICA,) who, without any previous instruction, performs many remarkable feats in arithmetical computations, no one of which is more singular, than the ready manner in which he discovers the factors of composite numbers, and ascertains those which have no factors or primes. The writer of this article has examined him very closely on these points, in order, if possible, to discover the process which he employs for this purpose, from the whole of which it appears, that he depends very much upon the terminating figures of the number proposed. As soon as a number is mentioned, he will tell you, that as it finishes with such and such figures, its divisor, if it has one, must finish with certain other figures, and he immediately attempts the division of it by prime numbers terminating in those digits; or, which is perhaps more probable, he endeavours to find a number which, multiplied by the former, will produce the number proposed, and if he do not readily succeed, he declares it to be a prime, and is frequently correct.

Not to mention a great many smaller numbers which were proposed to him, and which he answered with great facility, it will be more to the purpose to state a few particulars relative to the number 4294967297, which was proposed to him at a dinner, where he and his father were present. This is the number mentioned above, which Fermat had stated to be a prime, but which Euler had found to be composite, consisting of the factors 641×6700417 . It was not of course expected that he could readily detect the factors in a number of such magnitude; but his attempts threw considerable light upon the process which he employed. He found, by the terminating digits of the number proposed, that its factors must be terminated with certain other digits, and thus formed a sort of table, which his father noted down

by his directions, and then again all such prime numbers as had those terminations, and by this means reduced the number of trials very considerably, and amongst the number of his divisors was found the real factor 641. In numbers of moderate extent, *viz.* such as consisted of four or five figures, this method of exclusions, which he employs, reduces the number of trials to a very few; and the rapidity with which he finds his supposed divisors, and applies them to the number proposed, is certainly one of the most extraordinary cases in the whole history of arithmetic. He undoubtedly possesses a remarkably retentive memory, but he owes still more to a very ready perception of the qualities and properties of numbers. And it is much to be regretted, that such rare talents are not duly cultivated, by placing him under the tuition of a master who is able to expand his infant ideas, and to direct his attention to subjects of greater interest than those in which he is now constantly engaged, in order to satisfy the curiosity of spectators, and the pecuniary views of his father.

We have been led into a longer digression than was at first intended respecting this remarkable boy: we shall now conclude this article by enumerating a few of the most remarkable properties of prime numbers, with a table of them as far as 216,000, which is double the extent to which they are carried in any other English work, and which it is presumed may be found useful in a great variety of cases connected with arithmetical and numeral problems.

1. Prime numbers are divided into different classes, according to the forms under which they are contained, each form having certain properties peculiar to it: and these are either linear or quadratic, according as the forms by which they are expressed are simple quantities or squares. Thus, the forms $4n + 1$, $4n - 1$, $6n + 1$, &c. are linear forms; but when we say prime numbers of the forms $x^2 + y^2$, $x^2 + 2y^2$, &c., these are called quadratic forms.

2. Every prime number is of one of the forms $4n + 1$, or $4n - 1$; that is, a prime number, when divided by 4, will either leave a remainder + 1, or - 1, which is one of the principal divisions or classifications of prime numbers; but these two forms, according as n is even or odd, are farther subdivided into the following; *viz.* $8n + 1$, $8n + 3$, $8n + 5$, $8n + 7$; and though a similar classification may be made to any modulus, yet those authors who have treated on this subject, seldom trace the properties of prime numbers to any other forms than those above given, and of these the most remarkable are as follow.

3. Every prime number of the form $4n + 1$, is at the same time of the form $x^2 + y^2$; or, which is the same, every prime number of the form $4n + 1$, is the sum of two integral squares, but it can be divided into two such squares only one way; thus $17 = 4^2 + 1^2$, $29 = 5^2 + 2^2$, $37 = 6^2 + 1^2$, &c.

As the form $4n + 1$ includes the two forms $8n + 1$, $8n + 5$; therefore every prime number contained in these two forms is the sum of two integral squares.

4. Every prime number $8n + 1$, is of the three forms $y^2 + z^2$, $y^2 + 2z^2$, and $y^2 - 2z^2$.

$$\text{Thus } 41 = 5^2 + 4^2 = 3^2 + 2 \cdot 4^2 = 7^2 - 2 \cdot 2^2$$

$$\text{And } 73 = 8^2 + 3^2 = 1^2 + 2 \cdot 6^2 = 9^2 - 2 \cdot 2^2$$

and the same for all other prime numbers of this form.

5. Every prime number of the form $8n + 3$, is of the form $y^2 + 2z^2$; that is, every prime number which, when divided by 8, leaves a remainder 3, is the sum of a square and double a square.

For example, 11, 19, 43, &c. are prime numbers of the

PRIME NUMBERS.

form $8n + 3$; and $11 = 3^2 + 2 \cdot 1^2$, $19 = 1^2 + 2 \cdot 3^2$, $43 = 5^2 + 2 \cdot 3^2$, &c.

6. Every prime number $8n + 7$, is of the form $y^2 - 2z^2$; or every prime number which, when divided by 8, leaves a remainder 7, is equal to the difference between a square and double a square.

Thus, $31 = 7^2 - 2 \cdot 3^2$, $47 = 7^2 - 2 \cdot 1^2$, &c. and the same for all other prime numbers of this form.

7. From these four properties we may readily draw the following theorems.

All prime numbers of the forms $8n + 1$, and $8n + 5$, are, exclusively of all others, contained in the formula $y^2 + 2z^2$.

All prime numbers of the forms $8n + 1$, and $8n + 7$, are, exclusively of all others, contained in the formula $y^2 - 2z^2$.

All prime numbers of the form $8n + 1$ are, at the same time, of the three forms $y^2 + z^2$, $y^2 + 2z^2$, $y^2 - 2z^2$.

The general demonstration of these very remarkable properties of prime numbers was first given by La Grange, in the Memoirs of Berlin for 1776.

It may not be amiss to observe here, that, when it is said that every prime number is of a certain form or forms, it must not be understood that, also conversely, every number contained in those forms is a prime number; for the converse does not obtain, as will be evident from a moment's inspection of any of the forms above given, nor indeed can any form be found that has this property, as we have already observed in the preceding part of this article.

8. The number of prime numbers is infinite; but the number of them, under any given number N , is very nearly expressed by the formula

$$N$$

$$\frac{\text{hyp. log. } N}{1.08366}$$

as may be verified by means of the following tablet, which contains the number of the primes, under and between certain periods, from 1 to 400,000. But for the demonstra-

tion of it we must refer the reader to part iii. of Le Gendre's "Essai sur la Theorie des Nombres."

Under	10000	Number of primes	1230
	20000	-	2263
	30000	-	3246
	40000	-	4204
	50000	-	5134
	60000	-	6058
	70000	-	6936
	80000	-	7837
	90000	-	8713
	100000	-	9592
	150000	-	13849
	200000	-	17984
	250000	-	22045
	300000	-	25998
	350000	-	29977
	400000	-	33861

Between	10000 and	20000	Number of primes	1033
	20000 —	30000	-	983
	30000 —	40000	-	958
	40000 —	50000	-	930
	50000 —	60000	-	924
	60000 —	70000	-	878
	70000 —	80000	-	901
	80000 —	90000	-	876
	100000 —	150000	-	4257
	150000 —	200000	-	4133
	200000 —	250000	-	4061
	250000 —	300000	-	3953
	300000 —	350000	-	3979
	350000 —	400000	-	3884

For a variety of other properties of prime numbers, see Le Gendre's Essai above quoted, Gauss' Disquisitiones Arithmeticae, Waring's Meditationes Algebraicae, and Barlow's Theory of Numbers.

PRIME NUMBERS.

1	281	659	1069	1511	1987	2423	2903	3413	3907	4409	4937	5443	5939	6473	6997	7561	8111
2	283	661	1087	1523	1993	2437	2909	3433	3911	4421	4943	5449	5953	6481	7001	7573	8117
3	293	673	1091	1531	1997	2441	2917	3449	3917	4423	4951	5471	5981	6491	7013	7577	8123
5	307	677	1093	1543	1999	2447	2927	3457	3919	4441	4957	5477	5987	6521	7019	7583	8147
7	311	683	1097	1549	2003	2459	2939	3461	3923	4447	4967	5479	6007	6529	7027	7589	8161
11	313	691	1103	1553	2011	2467	2953	3463	3929	4451	4969	5483	6011	6547	7039	7591	8167
13	317	701	1109	1559	2017	2473	2957	3467	3931	4457	4973	5501	6029	6551	7043	7603	8171
17	331	709	1117	1567	2027	2477	2963	3469	3943	4463	4987	5503	6037	6553	7057	7607	8179
19	337	719	1123	1571	2029	2503	2969	3491	3947	4481	4993	5507	6043	6563	7069	7621	8191
23	347	727	1129	1579	2039	2521	2971	3499	3967	4483	4999	5519	6047	6569	7079	7639	8209
29	349	733	1151	1583	2053	2531	2999	3511	3989	4493	5003	5521	6053	6571	7103	7643	8219
31	353	739	1153	1597	2063	2539	3001	3517	4001	4507	5009	5527	6067	6577	7109	7649	8221
37	359	743	1163	1601	2069	2543	3011	3527	4003	4513	5011	5531	6073	6581	7121	7669	8231
41	367	751	1171	1607	2081	2549	3019	3529	4007	4517	5021	5557	6079	6599	7127	7673	8233
43	373	757	1181	1609	2083	2551	3023	3533	4013	4519	5023	5563	6089	6607	7129	7681	8237
47	379	761	1187	1613	2087	2557	3037	3539	4019	4523	5039	5569	6091	6619	7151	7687	8243
53	383	769	1193	1619	2089	2579	3041	3541	4021	4547	5051	5573	6101	6637	7159	7691	8263
59	389	773	1201	1621	2099	2591	3049	3547	4027	4549	5059	5581	6113	6653	7177	7699	8269
61	397	787	1213	1627	2111	2593	3061	3557	4049	4561	5077	5591	6121	6659	7187	7703	8273
67	401	797	1217	1637	2113	2609	3067	3559	4051	4567	5081	5623	6131	6661	7193	7717	8287
71	409	809	1223	1657	2129	2617	3079	3571	4057	4583	5087	5639	6133	6673	7207	7723	8291
73	419	811	1229	1663	2131	2621	3083	3581	4073	4591	5099	5641	6143	6679	7211	7727	8293
79	421	821	1231	1667	2137	2633	3089	3583	4079	4597	5101	5647	6151	6689	7213	7741	8297
83	431	823	1237	1669	2141	2647	3109	3593	4091	4603	5107	5651	6163	6691	7219	7753	8311
89	433	827	1249	1693	2143	2657	3119	3607	4093	4621	5113	5653	6173	6701	7229	7757	8317
97	439	829	1259	1697	2153	2659	3121	3613	4099	4637	5119	5657	6197	6703	7237	7759	8329
101	443	839	1277	1699	2161	2663	3137	3617	4111	4639	5147	5659	6199	6709	7243	7789	8353
103	449	853	1279	1709	2179	2671	3163	3623	4127	4643	5153	5669	6203	6719	7247	7793	8363
107	457	857	1283	1721	2203	2677	3167	3631	4129	4649	5167	5683	6211	6733	7253	7817	8369
109	461	859	1289	1723	2207	2683	3169	3637	4133	4651	5171	5689	6217	6737	7283	7823	8377
113	463	863	1291	1733	2213	2687	3181	3643	4139	4657	5179	5693	6221	6761	7297	7829	8387
127	467	877	1297	1741	2221	2699	3187	3659	4153	4663	5189	5701	6229	6763	7307	7841	8389
131	479	881	1301	1747	2237	2693	3191	3671	4157	4673	5197	5711	6247	6779	7309	7853	8419
137	487	883	1303	1753	2239	2699	3203	3673	4159	4679	5209	5717	6257	6781	7321	7867	8423
139	491	887	1307	1759	2243	2707	3209	3677	4177	4691	5227	5737	6263	6791	7331	7873	8429
149	499	907	1319	1777	2251	2711	3217	3691	4201	4703	5231	5741	6269	6793	7333	7877	8431
151	503	911	1321	1783	2267	2713	3221	3697	4211	4721	5233	5743	6271	6803	7349	7879	8443
157	509	919	1327	1787	2269	2719	3229	3701	4217	4723	5237	5749	6277	6823	7351	7883	8447
163	521	929	1361	1789	2273	2729	3251	3709	4219	4729	5261	5779	6287	6827	7369	7901	8461
167	523	937	1367	1801	2281	2731	3253	3719	4229	4733	5273	5783	6299	6829	7393	7907	8467
173	541	941	1373	1811	2287	2741	3257	3727	4231	4751	5279	5791	6301	6833	7411	7919	8501
179	547	947	1381	1823	2293	2749	3259	3733	4241	4759	5281	5801	6311	6841	7417	7927	8513
181	557	953	1399	1831	2297	2753	3271	3739	4243	4783	5297	5807	6317	6857	7433	7933	8521
191	563	967	1409	1847	2309	2767	3299	3761	4253	4787	5303	5813	6323	6863	7451	7937	8527
193	569	971	1423	1861	2311	2777	3301	3767	4259	4789	5309	5821	6329	6869	7457	7949	8537
197	571	977	1427	1867	2333	2789	3307	3769	4261	4793	5323	5827	6337	6871	7459	7951	8539
199	577	983	1429	1871	2339	2791	3313	3779	4271	4799	5333	5839	6343	6883	7477	7963	8543
211	587	991	1433	1873	2341	2797	3319	3793	4273	4801	5347	5843	6353	6899	7481	7993	8563
223	593	997	1439	1877	2347	2801	3323	3797	4283	4813	5351	5849	6359	6907	7487	8009	8573
227	599	1009	1447	1879	2351	2803	3329	3803	4289	4817	5381	5851	6361	6911	7489	8011	8581
229	601	1013	1451	1889	2357	2819	3331	3821	4297	4831	5387	5857	6367	6917	7499	8017	8597
233	607	1019	1453	1901	2371	2833	3343	3823	4327	4861	5393	5861	6373	6947	757	8039	8599
239	613	1021	1459	1907	2377	2837	3347	3833	4337	4871	5399	5867	6379	6949	7517	8053	8609
241	617	1031	1471	1913	2381	2843	3359	3847	4339	4877	5407	5869	6389	6959	7523	8059	8623
251	619	1033	1481	1931	2383	2851	3361	3851	4349	4889	5413	5879	6397	6961	7529	8069	8627
257	631	1039	1483	1933	2389	2857	3371	3853	4357	4903	5417	5881	6421	6907	7537	8081	8629
263	641	1049	1487	1949	2393	2861	3373	3863	4363	4909	5419	5897	6427	6971	7541	8087	8641
269	643	1051	1489	1951	2399	2879	3389	3877	4373	4919	5431	5903	6449	6977	7547	8089	8647
271	647	1061	1493	1973	2411	2887	3391	3881	4391	4931	5437	5923	6451	6983	7549	8093	8663
277	653	1063	1499	1979	2417	2897	3407	3889	4397	4933	5441	5927	6469	6991	7559	8101	8669

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8677	9199	9733	10271	10859	11443	12011	12553	13109	13697	14323	14851	15401	15971	16603
8681	9203	9739	10273	10861	11447	12037	12569	13121	13709	14327	14867	15413	15973	16607
8689	9209	9743	10289	10867	11467	12041	12577	13127	13711	14341	14869	15427	15991	16619
8693	9221	9749	10301	10883	11471	12043	12583	13147	13721	14347	14879	15439	16001	16631
8699	9227	9767	10303	10889	11483	12049	12589	13151	13723	14369	14887	15443	16007	16633
8707	9239	9769	10313	10891	11489	12071	12601	13159	13729	14387	14891	15451	16033	16649
8713	9241	9781	10321	10903	11491	12073	12611	13163	13751	14389	14897	15461	16057	16651
8719	9257	9787	10331	10909	11497	12097	12613	13171	13757	14401	14923	15467	16061	16657
8731	9277	9791	10333	10937	11503	12101	12619	13177	13759	14407	14929	15473	16063	16661
8737	9281	9803	10337	10939	11519	12107	12637	13183	13763	14411	14939	15493	16067	16673
8741	9283	9811	10343	10949	11527	12109	12641	13187	13781	14419	14947	15497	16069	16691
8747	9293	9817	10357	10957	11549	12113	12647	13217	13789	14423	14951	15511	16073	16693
8753	9311	9829	10369	10973	11551	12119	12653	13219	13799	14431	14957	15527	16087	16699
8761	9319	9833	10391	10979	11579	12143	12659	13229	13807	14437	14969	15541	16091	16703
8779	9323	9839	10399	10987	11587	12149	12671	13241	13829	14447	14983	15551	16097	16729
8783	9337	9851	10427	10993	11593	12157	12689	13249	13831	14449	15013	15559	16103	16741
8803	9341	9857	10429	11003	11597	12161	12697	13259	13841	14461	15017	15569	16111	16747
8807	9343	9859	10433	11027	11617	12163	12703	13267	13859	14479	15031	15581	16127	16759
8819	9349	9871	10453	11047	11621	12197	12713	13291	13873	14489	15053	15583	16139	16763
8821	9371	9883	10457	11057	11633	12203	12721	13297	13877	14503	15061	15601	16141	16787
8831	9377	9887	10459	11059	11657	12211	12739	13309	13879	14519	15073	15607	16183	16811
8837	9391	9901	10463	11069	11677	12227	12743	13313	13883	14533	15077	15619	16187	16823
8839	9397	9907	10477	11071	11681	12239	12757	13327	13901	14537	15083	15629	16189	16829
8849	9403	9923	10487	11083	11689	12241	12763	13331	13903	14543	15091	15641	16193	16831
8861	9413	9929	10499	11087	11699	12251	12781	13337	13907	14549	15101	15643	16217	16843
8863	9419	9931	10501	11093	11701	12253	12791	13339	13913	14551	15107	15647	16223	16871
8867	9421	9941	10513	11113	11717	12263	12799	13367	13921	14557	15121	15649	16229	16879
8887	9431	9949	10529	11117	11719	12269	12809	13381	13931	14561	15131	15661	16231	16883
8893	9433	9967	10531	11119	11731	12277	12821	13397	13933	14563	15137	15667	16249	16889
8923	9437	9973	10559	11131	11743	12281	12823	13399	13963	14591	15139	15671	16253	16901
8929	9439	10007	10567	11149	11777	12289	12829	13411	13967	14593	15149	15679	16267	16903
8933	9461	10009	10589	11159	11779	12301	12841	13417	13997	14621	15161	15683	16273	16921
8941	9463	10037	10597	11161	11783	12323	12853	13421	13999	14627	15173	15727	16301	16927
8951	9467	10039	10601	11171	11789	12329	12889	13441	14009	14629	15187	15731	16319	16931
8963	9473	10061	10607	11173	11801	12343	12893	13451	14011	14633	15193	15733	16333	16937
8969	9479	10067	10613	11177	11807	12347	12899	13457	14029	14639	15199	15737	16339	16943
8971	9491	10069	10627	11197	11813	12373	12907	13463	14033	14653	15217	15739	16349	16963
8999	9497	10079	10631	11213	11821	12377	12911	13469	14051	14657	15227	15749	16361	16979
9001	9511	10091	10639	11239	11827	12379	12917	13477	14057	14669	15233	15761	16363	16981
9007	9521	10093	10651	11243	11831	12391	12919	13487	14071	14683	15241	15767	16369	16987
9011	9533	10099	10657	11251	11833	12401	12923	13499	14081	14699	15259	15773	16381	16993
9013	9539	10103	10663	11257	11839	12409	12941	13513	14083	14713	15263	15787	16411	17011
9029	9547	10111	10667	11261	11863	12413	12953	13523	14087	14717	15269	15791	16417	17021
9041	9551	10133	10687	11273	11867	12421	12959	13537	14107	14723	15271	15797	16421	17027
9043	9587	10139	10691	11279	11887	12433	12967	13553	14143	14731	15277	15803	16427	17029
9049	9601	10141	10709	11287	11897	12437	12973	13567	14149	14737	15287	15809	16433	17033
9059	9613	10151	10711	11299	11903	12451	12979	13577	14153	14741	15289	15817	16447	17041
9067	9619	10159	10723	11311	11909	12457	12983	13591	14159	14747	15299	15823	16451	17047
9091	9623	10163	10729	11317	11923	12473	13001	13597	14173	14753	15307	15859	16453	17053
9103	9629	10169	10733	11321	11927	12479	13003	13613	14177	14759	15313	15877	16477	17077
9109	9631	10177	10739	11329	11933	12487	13007	13619	14197	14767	15319	15881	16481	17093
9127	9643	10181	10753	11351	11939	12491	13009	13627	14207	14771	15329	15887	16487	17099
9133	9649	10193	10771	11353	11941	12497	13033	13633	14221	14779	15331	15889	16493	17107
9137	9661	10211	10781	11369	11953	12503	13037	13649	14243	14783	15349	15901	16519	17117
9151	9677	10223	10789	11383	11959	12511	13043	13669	14249	14797	15359	15907	16529	17123
9157	9679	10243	10799	11393	11969	12517	13049	13679	14251	14813	15361	15913	16547	17137
9161	9689	10247	10831	11399	11971	12527	13063	13681	14281	14821	15373	15919	16553	17159
9173	9697	10253	10837	11411	11981	12539	13093	13687	14293	14827	15377	15923	16561	17167
9181	9719	10259	10847	11423	11987	12541	13099	13691	14303	14831	15383	15937	16567	17183
9187	9721	10267	10853	11437	12007	12547	13103	13693	14321	14843	15391	15959	16573	17189

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17191	17783	18313	19009	19571	20149	20771	21383	21943	22543	23099	23743	24281	24977	25603
17203	17789	18329	19013	19577	20161	20773	21391	21961	22549	23117	23747	24317	24979	25609
17207	17791	18341	19031	19583	20173	20789	21397	21977	22567	23131	23753	24329	24989	25621
17209	17807	18353	19037	19597	20177	20807	21401	21991	22571	23143	23761	24337	25013	25633
17231	17827	18367	19051	19603	20183	20809	21407	21997	22573	23159	23767	24359	25031	25639
17239	17837	18371	19069	19609	20201	20849	21419	22003	22613	23167	23773	24371	25033	25643
17257	17839	18379	19073	19661	20219	20857	21433	22013	22619	23173	23789	24373	25037	25657
17291	17851	18397	19079	19681	20231	20873	21467	22027	22621	23189	23801	24379	25057	25667
17293	17863	18401	19081	19687	20233	20879	21481	22031	22637	23197	23803	24391	25073	25673
17299	17881	18413	19087	19697	20249	20887	21487	22037	22639	23201	23819	24407	25087	25679
17317	17891	18427	19121	19699	20261	20897	21491	22039	22643	23203	23827	24413	25097	25693
17321	17903	18433	19139	19709	20269	20899	21493	22051	22651	23209	23831	24419	25111	25703
17327	17909	18439	19141	19717	20287	20903	21499	22063	22669	23227	23833	24421	25117	25717
17333	17911	18443	19157	19727	20297	20921	21503	22067	22679	23251	23857	24439	25121	25733
17341	17921	18451	19163	19739	20323	20929	21517	22073	22691	23269	23869	24443	25127	25741
17351	17923	18457	19181	19751	20327	20939	21521	22079	22697	23279	23873	24469	25147	25747
17359	17929	18461	19183	19753	20333	20947	21523	22091	22699	23291	23879	24473	25153	25759
17377	17939	18481	19207	19759	20341	20959	21529	22093	22709	23293	23887	24481	25163	25763
17383	17957	18493	19211	19763	20347	20963	21557	22109	22717	23297	23893	24499	25169	25771
17387	17959	18503	19213	19777	20353	20981	21559	22111	22721	23311	23899	24509	25171	25793
17389	17971	18517	19219	19793	20357	20983	21563	22123	22727	23321	23909	24517	25183	25799
17393	17977	18521	19231	19801	20359	21001	21569	22129	22739	23327	23911	24527	25189	25801
17401	17981	18523	19237	19813	20369	21011	21577	22133	22741	23333	23917	24533	25219	25819
17417	17987	18539	19249	19819	20389	21013	21587	22147	22751	23339	23929	24547	25229	25841
17419	17989	18541	19259	19841	20393	21017	21589	22153	22769	23357	23957	24551	25237	25847
17431	18013	18553	19267	19843	20399	21019	21599	22157	22777	23369	23971	24571	25243	25849
17443	18041	18583	19273	19853	20407	21023	21601	22159	22783	23371	23977	24593	25247	25867
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207821	208501	209267	209939	210599	211313	212057	212909	213637	214391	215143	215909	216731
207833	208511	209269	209953	210601	211319	212081	212917	213641	214399	215153	215921	216743
207847	208513	209299	209959	210619	211333	212099	212923	213649	214433	215161	215927	216751
207869	208519	209311	209971	210631	211339	212117	212969	213659	214439	215179	215939	216757
207877	208529	209317	209977	210643	211349	212123	212981	213713	214451	215183	215953	216761
207923	208553	209327	209983	210659	211369	212131	212987	213721	214457	215191	215959	216779
207931	208577	209333	209987	210671	211373	212141	212999	213727	214463	215197	215981	216781
207941	208589	209347	210011	210709	211403	212161	213019	213737	214469	215239	215983	216787
207947	208591	209353	210019	210713	211427	212167	213023	213751	214481	215249	216023	216791
207953	208609	209357	210031	210719	211433	212183	213029	213791	214483	215261	216037	216803
207967	208627	209359	210037	210731	211441	212203	213043	213799	214499	215273	216061	216829
207971	208631	209371	210053	210739	211457	212207	213067	213821	214507	215279	216071	216841
207973	208657	209381	210071	210761	211469	212209	213079	213827	214517	215297	216091	216851
207997	208667	209393	210097	210773	211493	212227	213091	213833	214519	215309	216103	216859
208001	208673	209401	210101	210803	211499	212239	213097	213847	214531	215317	216107	216877
208003	208687	209431	210109	210809	211501	212243	213119	213859	214541	215329	216113	216899
208009	208697	209441	210113	210811	211507	212281	213131	213881	214559	215351	216119	216901
208037	208699	209449	210127	210823	211543	212293	213133	213887	214561	215353	216127	216911
208049	208721	209459	210131	210827	211559	212297	213139	213901	214589	215359	216133	216917
208057	208729	209471	210139	210839	211571	212353	213149	213919	214603	215381	216149	216919
208067	208739	209477	210143	210853	211573	212369	213173	213929	214607	215389	216157	216947
208073	208759	209497	210157	210857	211583	212383	213181	213943	214631	215393	216173	216967
208099	208787	209519	210169	210869	211597	212411	213193	213947	214639	215399	216179	216973
208111	208799	209533	210173	210901	211619	212419	213203	213949	214651	215417	216211	216991
208121	208807	209543	210187	210907	211639	212423	213209	213953	214657	215443	216217	217001
208129	208837	209549	210191	210911	211643	212437	213217	213973	214663	215447	216233	217003
208139	208843	209563	210193	210913	211657	212447	213223	213977	214667	215459	216259	217027
208141	208877	209567	210209	210923	211661	212453	213229	213989	214673	215461	216263	217033
208147	208889	209569	210229	210929	211663	212461	213247	214003	214691	215471	216289	217057
208189	208891	209579	210233	210943	211681	212467	213253	214007	214723	215483	216317	217069
208207	208907	209581	210241	210961	211691	212479	213263	214009	214729	215497	216319	217081
208213	208927	209597	210247	210967	211693	212501	213281	214021	214733	215503	216329	217111
208217	208931	209621	210257	211007	211711	212507	213287	214031	214741	215507	216347	217117
208223	208933	209623	210263	211039	211723	212557	213289	214033	214759	215521	216371	217121
208231	208961	209639	210277	211049	211727	212561	213307	214043	214763	215531	216373	217157
208253	208963	209647	210283	211051	211741	212573	213319	214051	214771	215563	216379	217163
208261	208991	209659	210299	211061	211747	212579	213329	214063	214783	215573	216397	217169
208277	208993	209669	210317	211063	211777	212587	213337	214069	214787	215587	216401	217199
208279	208997	209687	210319	211067	211781	212593	213349	214087	214789	215617	216421	217201
208283	209021	209701	210323	211073	211789	212627	213359	214091	214807	215653	216431	217207
208291	209029	209707	210347	211093	211801	212633	213361	214129	214811	215659	216451	217219

PRIME Vertical. See VERTICAL.

PRIME Verticals, in *Dialling*, or *Prime vertical dials*, are those projected on the plane of the prime vertical circle, or on planes parallel to it.

These are what we likewise call direct, erect, north, or south dials. But since every plane hath that pole raised or depressed upon it, which lies open to it, therefore this plane (if a direct south) hath the south pole elevated; and, consequently, the style, whose height must be the complement of the latitude of the place, will point downwards. Wherefore, to find the hour's distance from the meridian upon this plane, the proportion is as the radius is to the sine of the style's height, or co-latitude, so is the tangent of the hour, or angle at the pole, to the tangent of the several hours distant from the meridian.

By this canon, the hours requisite for the plane, as also the half-hours, quarters, &c. being calculated and set in a table; the dial is described after the same manner as the horizontal dial. North direct erect dials are but the reverse side of the south, because lying in the same azimuth with it; therefore it is no more but turning the south dial upside down, and leaving out the superfluous hours between 5 and 7, and 4 and 8, and the north dial is made. Only note, that the style must point upwards to the north pole. See DIAL.

PRIME of the Moon, is the new moon at her first appearance, for about three days after her change. See GOLDEN NUMBER.

PRIME is also used, in the Romish church, for the first of the canonical hours, succeeding to lauds.

PRIME, in *Fencing*, is the first and chief of the guards; which is that the body is in, immediately after drawing the sword; being fittest to menace and terrify the enemy, by reason the point of the sword is held higher up to the eye than in any of the other guards.

PRIME, or *Priming of a Gun*. See PRIMING.

PRIMEIRA, in *Geography*, a river of Africa, which branches off from the Formosa, and runs into the Atlantic, 15 miles W. of the main stream.

PRIMEL POINT, a cape of France, in the English channel; 8 miles E.N.E. of St. Pol de Leon. N. lat. 48° 43'. W. long. 4°.

PRIMER FINE, in *Law*. See PRÆFINE.

PRIMER Seisin, *Prima seisina*, or the *first seisin*; a branch of the king's prerogative, by which he had the first possession of all lands and tenements held of him in chief, of which his tenant died seised in fee; and consequently the rents and profits of them, till livery was sued, which suit being commonly within a year and day next after the death of the tenant, therefore the king used to take at an average the first fruits, that is to say, one year's profit of the land. And this afterwards gave a handle to the popes, who claimed to be feudal lords of the church, to claim in like manner from every clergyman in England the first year's profits of his benefice, by way of primitiæ, or first fruits.

These payments were only due, if the heir was of full age; but if he was under the age of twenty-one, being a male, or fourteen, being a female, the lord was entitled to the wardship of the heir, and was called the *guardian in chivalry*.

But all charges arising by primer seisin, are annulled by stat. 12 Car. II.

PRIMICERIUS, in *Antiquity*, the first or chief person in any office or dignity.

In this sense the word occurs frequently in the code, and even in our old English laws: though it is there also occasionally used for a nobleman; as *primicerius totius Angliae*.

The Romans had great variety of primicerii, both in the church and the emperor's court; a *primicerius of the empress*, *primicerius Augustalis*, *primicerius of the bardariotæ*, *primicerii of the legions*, *of the court*, *of the chamber*, *of the palace*, &c.

The *ecclesiastical primicerius*, Du-Cange observes, was the same with the *chantor* among us.

In the church of Metz, the primicerius is the first dignitary of the diocese, and presides at assemblies of the clergy, in prejudice of the bishop.

At Venice the dean of the church of St. Mark is called *primocirio*, or *primicerius*: he is independent of the patriarch of Venice, and enjoys episcopal privileges.

PRIMIERO, in *Geography*, a small island in the gulf of Venice, near the coast of Friuli. N. lat. 45° 45'. E. long. 13° 30'.

PRIMING, or *PRIME of a Gun*, is the gunpowder put into the pan of small arms, and into the vent of cannon, near the opening of the touch-hole, in order to fire the piece. The priming is the last thing done in charging. See CHARGE.

For pieces of ordnance, they have a pointed iron rod to pierce the cartridge through the touch-hole, called the *primer*, or *priming-iron*: and it serves to discover whether the powder contained in it is thoroughly dry, and fit for immediate service.

PRIMING, among *Painters*, signifies the laying on of the first colour.

PRIMING, in *Japan Work*. See JAPANING.

PRIMIPILARII, or **PRIMOPILARII**, or *Primipilares*, in *Antiquity*, were properly such as had formerly borne the office of primipilus, or first centurion of a legion, to whom was entrusted the care of the banner.

Some will also have primipilarii to have been a denomination given to the soldiers of the first cohort of a legion.

The primipilarii had considerable advantages; one of the chief was, that most of the soldiers who died in the campaign, left them their heirs.

PRIMIPILUS, or **PRIMOPILUS**, or *Primipili centurio*, the centurion of the first cohort of a legion, who had charge of the Roman eagle.

PRIMITIÆ, the first fruits gathered of the earth; of which the ancients made presents to the gods.

In Leviticus, the primitiæ of all fruits are enjoined to be offered to God.

In our law, the primitiæ are one year's profits, after avoidance, of every spiritual living, as rated in the king's books. See *PRIMER Seisin*, and *FIRST fruits*.

PRIMITIVE, in *Grammar*, a root; or a word in a language, which is neither derived from any other language, nor compounded from any other words of the same. See *ROOT*, *WORD*, &c.

Thus *God* is a primitive; *Godly*, a derivative; *God-like*, a compound.

PRIMITIVE, in *Arithmetic*. See PRIME and NUMBER.

PRIMO, in the *Italian Music*, is often abridged thus, P° or I°, and added to other words, as, *primo canto*, the first treble; *alto primo*, the first counter-tenor; *tenore primo*, the first tenor; *basso primo*, the first bass; *fagotto primo*, the first bassoon; *choro primo*, the first chorus, &c.

PRIMO beneficio ecclesiastico habendo, in *Law*, a writ directed from the king to the lord chancellor, appointing him to bestow the benefice that shall first fall in the king's gift, above or under such a value, upon this or that clerk. See *BENEFICE*.

Propositio de Primo adjacentē. See PROPOSITION.

PRIMOICHE, NIZ, in *Geography*, a town of Russia, in the

the government of Saratov, on the Motcha; 104 miles E. of Chvalinsk.

PRIMOCHÉ, *Sred*, a town of Russia, in the government of Saratov, on the Motcha; 108 miles E. of Chvalinsk.

PRIMOCHÉ, *Var*, a town of Russia, in the government of Saratov; 116 miles E. of Chvalinsk.

PRIMOGENITURE, PRIMOGENITURA, the right of first-born, or eldest son or child.

The right of primogeniture seems to be an unjust prerogative, and contrary to natural right: for since it is birth alone that gives children a title to the paternal succession, the chance of primogeniture should not throw an inequality among them.

The "inherent prerogative of primogeniture," as Mr. Gibbon denominates it, was unknown among the Romans: the two sexes were placed upon a just level; all the sons and daughters were entitled to an equal portion of the paternal estate; and if any of the sons had been intercepted by a premature death, his person was represented, and his share was divided by his surviving children. On the failure of the direct line, the right of succession must diverge to the collateral branches.

Accordingly, the right of primogeniture, which calls the elder born to the crown, preferably to the others, was not introduced into France till very late: it was unknown to the first race of kings; and even to the second.

The four sons of Clovis shared the kingdom equally among themselves; and Louis le Debonnaire did the same: it was not till the race of Hugh Capet, that the prerogative of succession to the crown was appropriated to the first-born.

By the ancient custom of gavel-kind, still preserved in some parts of our island, primogeniture is of no account; the paternal estate being equally shared by all the sons. See DESCENT, and *Right of Crown*.

PRIMOPILUS. See PRIMIPILUS.

PRIMORES, in *Ornithology*, denote the quill-feathers which spring from the first bones of the wings, and are ten in number.

PRIMORIE, in *Geography*, a province of Dalmatia, on the coast of the Adriatic, between the Cetina and the Narenta. This was called by the ancients "Dalmatia," and by the later Greeks "Parathalassia."

PRIMROSE, JAMES, in *Biography*, an ingenious physician, was born of Scottish parents at St. Jean d'Angely, in the province of Guienne, in France, where his father was minister. He received the degree of master of arts at Bourdeaux, and then went to Paris, where he was enabled to pursue his medical studies by the liberal patronage of James I. king of England. He afterwards completed his education at Montpellier, where he was admitted to the doctorate in the year 1617; and then repaired to England, with a view to practise his profession. In 1629 he was admitted ad eundem at Oxford, and forthwith settled at Hull, where he acquired extensive reputation and practice. He was author of many works, some of which, however, remain the monuments of his illiberality and prejudice, being written in a captious style, in opposition to the discovery of the circulation, recently promulgated by the immortal Harvey, with all the demonstrative proofs that can even now be adduced, if we except that of the microscope. The following are the titles of his works: "Exercitationes et Animadversiones in Librum de Motu cordis et Circulatione sanguinis, adversus Gul. Harveum;" Lond. 1630. "Animadversiones de Joannis Waldi Disputatione quam pro circulatione sanguinis proposuit;" Amst. 1639. "De vulgi Erroribus in Medicina;" ibid. 1639. This work passed

through many editions, and was translated into French and English. "Animadversiones in Theses quas pro circulatione sanguinis in Academia Ultrajectensi Henricus le Roy proposuit;" Lug. Bat. 1640. "Enchyridion Medicum Practicum;" Amst. 1650. "Ars Pharmaceutica;" ibid. 1651. "De Morbis Mulierum et Symptomatis Libri V.;" Rot. 1655. "Destructio Fundamentorum Medicina Vobisci Fortunati Plempii;" ibid. 1657. "De Febribus Liber IV.;" ibid. 1658. "De Morbis Puerorum Partes duæ;" Rot. 1659. Eloy Dict. Hist. de la Med.

PRIMROSE, in *Botany*, &c. See PRIMULA.

PRIMROSE, *Evening or Night*. See CENOTHERA.

PRIMROSE, *Peerless*. See NARCISSUS.

PRIMULA, in *Botany*, a name given to the Primrose, as the first offering of spring, (from *primus*,) and retained by Linnæus for the genus to which that favourite flower belongs; though, as he remarks in some parts of his writings, there are plants, in various countries, more strictly entitled to such an appellation.—Linn. Gen. 80. Schreb. 106. Willd. Sp. Pl. v. 1. 800. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 222. Ait. Hort. Kew. v. 1. 307. Pursh 137. Juss. 96. Lamarck Illustr. t. 98. Gært. t. 50.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Precia*, Linn. *Lyfimachia*, Juss. *Primulaceæ*, Ventenat, Brown.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, tubular, with five angles, and five acute upright teeth, permanent. *Cor.* of one petal; tube cylindrical, about the length of the calyx, terminating in a small hemispherical neck; limb spreading, cut half way down into five inversely heart-shaped, emarginate, obtuse segments; throat pervious. *Stam.* Filaments five, very short, in the neck of the corolla; anthers pointed, erect, converging, within the mouth. *Pist.* Germen superior, globose; style thread-shaped, the length of the calyx; stigma globose. *Peric.* Capsule roundish, full as long as the perianth which clothes it, of one cell, opening with ten teeth at the summit. *Seeds* numerous, roundish, on an ovate-oblong unconnected receptacle.

Ess. Ch. Capsule of one cell, with ten teeth. Tube of the corolla cylindrical; throat pervious. Stigma globose.

Linnæus reckoned up seven or eight species of *Primula*; Willdenow 18. They are all hardy, perennial, herbaceous plants, natives of cool, generally mountainous, countries, and blossoming in the spring. Their leaves are simple and radical. Flower-stalks radical; for the most part umbellate. Flowers red, purple, or yellow, varying in some species from one hue to the other, and frequently sweet-scented. Four species, or more properly three, are natives of Britain; and of these, with a few of the most remarkable foreign ones, we shall give characters and synonyms.

P. vulgaris. Common Primrose. Hudl. 83. Fl. Brit. n. 1. Engl. Bot. t. 4. Ait. n. 1. (*P. acaulis*; Curt. Lond. fasc. 6. t. 16. *P. veris* γ ; Linn. Sp. Pl. 205. *P. elatior* β ; Willd. n. 3. *P. veris minor*; Ger. Em. 781.)—Leaves toothed, wrinkled. Stalks single-flowered. Limb of the corolla flat.—Native of groves, thickets and banks, on a fertile soil, throughout Europe, blossoming with us in profusion in April and May. The root is oblong, toothed, rather fleshy. Leaves obovate-oblong, light green, rugged, somewhat pubescent, four or five inches in length, but much enlarged after the flowers are past. Flower-stalks numerous, about equal to the leaves, simple, though more or less distinctly united by a common base, and occasionally elevated all together on one general stalk, so as to compose an umbel, accompanied by lanceolate bractæas, termed by Linnæus an *involutum*. Flowers of a delicate sulphur-colour, with an orange eye, faintly but agreeably scented. A rose-coloured variety is found in the Levant, and sometimes occurs in England.

PRIMULA.

England. We have seen it originate, with either a simple or compound inflorescence, as above described, from seeds of the common Primrose, and hence perhaps came the Polyanthus, so industriously cultivated. The gardeners keep a double lilac-coloured variety, Curt. Mag. t. 229, which is easily increased, and a less hardy one of a dark brown; but the double sulphur-coloured Primrose is peculiarly elegant. This last blooms regularly two or three weeks later than the rest.

P. elatior. Oxlip, or Great Cowslip. With. 234. Fl. Brit. n. 2. Engl. Bot. t. 513. Ait. n. 2. (*P. elatior* α ; Willd. n. 3. *P. veris* β ; Linn. Sp. Pl. 204.)—Leaves toothed, wrinkled. Stalk many-flowered. Limb of the corolla flat.—Found in groves, pastures and thickets, in England and elsewhere, but not frequently. It seems to be a variety of the former, with a greatly elevated common *flower-stalk*, and much shorter partial ones. The *flowers* however are smaller, and more drooping. The *leaves* are occasionally contracted in the middle, but less regularly or distinctly than those of the following. We are most inclined to think this true *P. elatior* a mule between the Primrose and Cowslip, distinct from the casually umbellate varieties of the former that are described above.

P. veris. Common Cowslip, or Paigle. Linn. Sp. Pl. 204. Willd. n. 2. Ait. n. 3. Fl. Brit. n. 3. Engl. Bot. t. 5. Bulliard t. 171. (*P. officinalis*; Curt. Lond. fasc. 6. t. 15. *P. veris* major; Ger. Em. 780.)—Leaves toothed, wrinkled, contracted in the middle. Stalk many-flowered. Limb of the corolla concave. Plentiful in meadows and pastures of England and other parts of Europe, but only on a strong soil of clay or marle, flowering in April or May. This is unquestionably a most distinct species, though Linnæus considered it as a variety of the Primrose. The blossoms communicate their aromatic fragrance, and narcotic quality, to made wines, which thence have a resemblance to the muscadel wines of the south of France.

P. farinosa. Bird's-eye Primrose. Linn. Sp. Pl. 205. Willd. n. 4. Ait. n. 4. Fl. Brit. n. 4. Engl. Bot. t. 6. Curt. Lond. fasc. 6. t. 14. Fl. Dan. t. 125. (*P. veris*, flore rubro; Ger. Em. 783.)—Leaves crenate, smooth; powdery underneath. Limb of the corolla flat. Found in boggy mountainous meadows in Westmoreland and the north-west part of Yorkshire, as well as in other sub-alpine countries of Europe, flowering in June or July. This pretty species is about half the size of the Cowslip. The *leaves* are of a deep shining green, and smooth, above; white and powdery, like the *flower-stalks* and *calyx*, underneath. *Corolla* of a beautiful rose-colour.

P. longiflora. Long-flowered Primula. Jacq. Austr. append. t. 46. Willd. n. 8.—Leaves serrated, smooth; powdery beneath. Umbel drooping. Tube of the corolla greatly elongated. Native of the alps of Switzerland, Italy, Carinthia, &c. Wulfen in Jacquin's work well asserts this to be a distinct species from the last, from which it differs in the length, and paler purplish hue, of the *corolla*, as well as in having larger, less powdery, *leaves*. We have fine specimens from the late Mr. Davall's herbarium.

P. marginata. Silver-edged Primula. Curt. Mag. t. 191. Willd. n. 10. Ait. n. 9.—Leaves obovate, with tooth-like powdery serratures. Stalk many-flowered. Bractæas shorter than the partial stalks. Said to be a native of the Swiss alps, from whence Messrs. Lee and Kennedy obtained, in 1777, this very pretty plant, now common in gardens, where it blooms in March and April. It is best kept in pots, with little moisture; and will not bear forcing. The *leaves* have a musky scent, and are strikingly bordered

with cream-coloured powder. The *corolla* is of an uniform deep lilac.

P. Auricula. Garden Auricula, or Bear's-ear. Linn. Sp. Pl. 205. Willd. n. 11. Ait. n. 10. (*Auricula urfi*, flore luteo; Ger. Em. 784.)—Leaves obovate, slightly serrated, smooth, more or less powdery. Stalk many-flowered, about the length of the foliage.—Native of the alps of Switzerland, Germany, Carniola, &c. We have gathered it on Mount Cenis. This, the origin of all the fine powdered garden auriculas, has, in a wild state, much less powdery *leaves*, whose edges are partially, but often coarsely, serrated; their form broadly and obtusely obovate, of a lax, leathery, twisted habit. The *flowers* are small and yellow, occasionally purple, or red, as usually seen in ordinary gardens. Their scent is grateful and peculiar.

P. cortusifoides. Cortusa-leaved Primula. Linn. Sp. Pl. 206. Willd. n. 5. Ait. n. 5. Curt. Mag. t. 399. Andr. Repof. t. 7. Jacq. Hort. Schoenbr. v. 3. 5. t. 259. (*P. n.* 33; Gmel. Sib. v. 4. 85. t. 45.)—Leaves wrinkled, lobed. Stalk many-flowered. Native of Siberia. Frequent in our more curious gardens, where it flowers in May and June. The *leaves* are of a fine green, without any mealiness, variously lobed and toothed. *Flowers* purple, very handsome. This species does indeed, as Linnæus observed, approach in habit to *Cortusa*, but his name is barbarously compounded.

PRIMULA, in *Gardening*, contains plants of the low, fibrous-rooted, herbaceous, flowery, perennial kind, of which the species cultivated are, the common primrose (*P. vulgaris*); the great cowslip or oxlip (*P. elatior*); the common cowslip or paigle (*P. officinalis*); the bird's-eye primrose (*P. farinosa*); the long-leaved bird's-eye primrose (*P. longifolia*); the cortusa-leaved primrose (*P. cortusifoides*); the silver-edged primrose (*P. marginata*); and the auricula, or bear's-ear (*P. auricula*).

The varieties of the first sort are numerous, being partly wild and partly produced by cultivation. The principal of which are; the common yellow-flowered; the white; the paper white; the red; the double yellow; the double white; the double red; the double pink; the double crimson primrose. It is a native of most parts of Europe, flowering in March and April with the wood anemone.

It is observed that a fine flower of this sort should possess a graceful elegance of form, a richness of colouring, and a perfect symmetry of parts. The properties are mostly similar to those which distinguish the auricula, in what relates to the stem or scape, the peduncles or flower-stalks, and the formation of the umbel, bunch or thyrse, vulgarly termed the *truss*; the tube of the corolla above the calyx should be short, well filled at the mouth with the anthers, and fluted termination rather above the eye; the eye should be round, of a bright clear yellow, and distinct from the ground-colour; the ground-colour is most admired when shaded with a light and dark rich crimson, resembling velvet, with one mark or stripe in the centre of each division of the border, bold and distinct from the edging down to the eye, where it should terminate in a fine point; the petals, technically termed the pips, should be large, quite flat, and perfectly circular, excepting the small indentures between each division, which separate it into five (sometimes six) heart-like segments; and the edging should resemble a bright gold lace, bold, clear and distinct, and so nearly of the same colour as the eye and stripes, as scarcely to be distinguished from it.

The second sort varies much in the colour of the flowers, but the chief are purple-flowered, red-flowered, gold-coloured, orange-coloured, with various shades of each.

The

The varieties in the third sort are the common single yellow cowslip; double yellow cowslip; scarlet cowslip; and hose, and hose cowslip.

The fourth sort varies in the size of the plant, having been found wild a foot and half in height; and in the cultivated plant, a tendency to become viviparous has been observed by Curtis, or to produce one or more tufts of leaves among the flowers of the umbel. In its wild state it seeds readily, and frequently when cultivated; the flowers also vary with different shades of purple, and have been found entirely white.

The eighth sort varies much in the leaves and flowers; as the oblong-leaved, roundish-leaved, broad-leaved, narrow-leaved, green-leaved, white or meal-leaved; the purple-flowered, of various shades and variegations; yellow-flowered, of different shades; double purple-flowered, double yellow-flowered, variegated purples, &c.

With regard to the properties of a fine auricula, they are these, according to Martyn; the stem should be strong, upright, and of such a height as that the umbel of flowers may be above the foliage of the plant; the peduncles or foot-stalks of the flowers should also be strong, and of a length proportional to the size and quantity of the flowers; which should not be less than seven in number, that the umbel may be regular and close; the tube, eye, and border should be well proportioned, which they will be, if the diameter of the first be one part, of the eye three, and the whole border six parts or thereabouts; the circumference of the border should be round, or nearly so, or at least not what is called starry; the anthers ought to be large, bold, and fill the tube well; and the tube should terminate rather above the eye, which should be very white, smooth, and round, without cracks, and distinct from the ground-colour; the ground-colour should be bold and rich, and regular, whether it be in one uniform circle, or in bright patches; it should be distinct at the eye, and only broken at the outer part into the edging; a fine black, purple, or bright coffee-colour, contrast best with the white eye; a rich blue, or bright pink, is pleasing; but a glowing scarlet or deep crimson would be most desirable, if well edged with a bright green; this, however, can seldom be expected; the green edge is the principal cause of the variegated appearance in this flower; and it should be in proportion to the ground-colour, that is, about one-half of each; the darker grounds are generally covered with a white powder, which seems necessary, as well as the white eye, to guard the flower from the scorching heat of the sun's rays.

It is observed that all flowers that want any of the above properties are turned out into the borders of the garden, or rejected wholly by every good florist, for as there are varieties every year from seeds, the bad ones must make room for their betters; but in some the passion for new flowers so much prevails, that supposing the old flower to be greatly preferable to a new one, the latter must take place, because it is of their own raising.

Method of Culture.—These beautiful plants are raised without much difficulty, by proper care and attention in their management, with respect to the parting of the roots, and the planting them out in their due season; they succeed best in a strong soil, and some of them, as the primrose kind, in a shady situation.

Culture in the Polyanthus Kinds.—These are all capable of being increased by seed, and the parting of the roots, the former being the only method for obtaining new varieties, or a large supply of plants. The seed should be collected from such flowers as have large upright stems, and which produce many flowers upon the stalk, being large, beautifully striped,

open, flat, and not pin-eyed, as from such seed a great variety of good sorts may be expected; care should however be taken that no bad or common flowers stand near them, as they will be apt to debase them, by the admixture of their farina.

The seeds should be sown in boxes or large pots filled with light rich mould. The proper season for this business is in the autumn, or the early spring; but the former is the better, as by sowing then the plants come up well the same year, and are strong and fit to plant out the following spring, and are fine plants for flowering the second spring. In the first season the sowing should be performed as soon as possible after the seed becomes well ripened; though some advise December as a good time, or the spring season, it may be done in February, March, or the following month. The seed should be sown over the surface tolerably thick, being covered in very lightly, and the boxes or pots placed where they may have a little of the morning sun, but not by any means the mid-day heats. The plants may be much forwarded by the pots or boxes being plunged in a mild hot-bed; in the spring, when dry, they should be frequently refreshed with water, in very moderate proportions at a time, removing the plants more into the shade as the heat advances, as it soon destroys them. The autumn-sown plants should have a warm situation during the winter, or be protected from frosts or severe weather by glasses or other means.

In the spring, or early summer, the plants of the different sowings will be sufficiently strong to plant out, for which a bed or shady border should be prepared, and made rich by neat's dung, on which the plants should be set out about four or five inches distant in every direction, care being taken to water them occasionally till well-rooted, after which they only require to be kept free from weeds; and when they flower in the following spring the best flowers should be marked, and the rest be removed into the borders or other places for affording variety; and the valuable plants may be removed, when they have finished flowering, into the borders or beds where they are designed to flower and remain, in the same manner as above, watering them slightly till well rooted again. The roots afterwards require to be parted and removed annually, and the earth of the borders renewed, to prevent their degenerating.

It is necessary, in order to keep up a proper stock of plants, to raise new seedling plants every two or three years, as the old plants mostly decline in beauty after the third year.

In the latter method, the roots should be parted in the beginning of the autumn, as soon as the flowering is over, and it may likewise be done early in the spring; but the former is the best time, as the plants get stronger and flower better in the spring. In performing the work the plants should be taken up out of the ground, and each bunch divided into several slips, not too small, unless where a great increase is wanted, being careful to preserve some root to each slip; they are then to be planted in a fresh dug border, enriched with dung as above, setting them five or six inches asunder, giving them water directly, and repeating it occasionally, till they have taken good root. The approved sorts may, in this way, be easily preserved.

These plants are observed by the editor of Miller's dictionary to be very liable to the depredations of snails and slugs, in the spring of the year; the plants and pots therefore should be carefully examined on all sides early in the morning. But their worst enemy is a small red spider or acarus, which, in summer, forms its web on the under-side of the leaves. These little insects, scarcely visible without a magnifying-glass, cause the leaves to become yellow and spotted,

spotted, and eventually destroy the plant; they multiply with such rapidity as to take possession of a whole collection in a very short time. Such plants as appear infected should therefore be immediately selected from the rest, taken up, and soaked for two or three hours in a strong infusion of tobacco water, and then re-planted in a fresh soil or compost, and removed to a situation at a distance from the former. But if the whole bed or border be overrun with this insect, it is best to take up all the plants, and, having soaked them, to plant them elsewhere. The bed or border should then be trenched up, and remain fallow to the next season, or be planted with another crop not liable to this calamity.

In their after-management, they are said to blow at the same time, and require nearly the same treatment as auriculas, both with respect to soil and situation; they are, however, more impatient of heat and drought, and more partial to shade and moisture. They may be set in the same sized pots, and in the same compost as the auricula, only with the addition of more loam; or they may be planted on cool shady beds or borders, being very hardy, and seldom perishing in the coldest and wettest seasons, because their parent is a native of this country; but during the heats of summer they are frequently destroyed, unless proper precautions are taken. This dislike to heat seems to indicate, it is added, that the polyanthus is rather the offspring of the primrose, which requires shade, than of the cowslip, which grows in open pastures; though Mr. Miller seems to regard it as a variety of the latter.

The roots of the wild plants, when they can be procured, may be taken up, divided, and planted out in the autumn, when they will flower in the following spring.

The fourth sort readily seeds in its wild state, and also frequently when cultivated; but is scarcely worth the pains to raise it from seed, since a strong root may be divided so as to form many plants; the best time for doing this is in the spring, soon after the leaves are expanded. Each off-set should be placed in a separate pot, filled with two parts of stiffish loam, and one part of light sandy bog-earth, watering and setting them in the shade, under a north wall or paling, but not under trees, keeping them there during the summer in pans of water, but in the autumn, as the wet season comes on, taking them out of the pans, and either laying the pots on their sides, or placing them during winter under a common cucumber frame, to keep them from immoderate wet, which this plant cannot bear, although it be a native of boggy meadows. In the following, if not the same year, these plants will blow strong; and they should be thus treated every year, as they require to have their roots frequently parted.

The fifth sort is increased by parting the roots, either in September, or at the beginning of March. It is hardy, of ready growth, and will succeed either in the pot or border, by guarding it from the sun in summer and from severe frost and too much wet in winter.

The sixth species, which is yet a rare plant, must be treated with care, as the fifth sort, and may be raised from seeds, or increased by parting the roots; but it is apt to be lost if not well attended to.

The seventh sort is delicate, and should be placed in a pot of stiffish loam, mixed with one-third rotten leaves, bog-earth, or dung, and plunged in a north border, taking care that it does not suffer for want of water in dry seasons; as when thus treated it increases by its roots nearly as readily as the auricula.

Culture in the Auricula Kinds.—These plants may all be

increased by feeds in order to procure new varieties, and by slipping the roots to increase the approved kinds.

In order to obtain good flowers from seeds, choice should be made of the best flowers, which should be exposed to the open air, that they may have the benefit of showers, without which they seldom produce good seeds: the time of their ripening is in June, which is easily known, by their seed-vessels turning to a brown colour, and opening, being then careful lest the seeds be scattered out of the vessel, as they will not be all fit to gather at the same time.

The proper soil for this sort of seed is good, fresh, light, sandy mould, mixed with very rotten neat's-dung, or very rotten dung from the bottom of an old hot-bed; with which the pots, boxes, or baskets in which the seeds are to be sown should be filled; and having levelled the surface very smooth, the seeds should be sown, sifting over them a little rotten willow mould; then covering them with a net or wire, to prevent cats or birds from scratching out, or burying the seeds so as to destroy them. Some persons never cover the seeds, but leave them on the surface for the rain to wash them into the ground, which is often the best method. The boxes, &c. should then be placed so as to receive half the day's sun during the winter season; but in the beginning of March be removed, where they may have only the morning sun till ten o'clock; for the young plants now soon begin to appear, which, if exposed to one whole day's sun only, are all destroyed. The proper season for sowing the seed is in the latter end of summer, or beginning of autumn, as about September, but they may be sown in the spring. During the summer season, the plants in dry weather should be often refreshed with water, never giving them too great a quantity at once. In the July following, the plants will be large enough to remove, at which time a bed must be prepared, or boxes filled with the above-mentioned soil, in which they may be planted about three inches apart, and shaded when in beds, every day, till they are thoroughly rooted, as also in very hot dry weather; but if they are in baskets or boxes, they may be removed to a shady situation.

When planted in beds, there should be some rotten neat's-dung laid about ten inches under the surface, and beaten down close and smooth: this will prevent the worms from drawing the young plants out of the earth, which they generally do where this is not practised. This dung should be laid about half a foot thick, which will entirely prevent the worms getting through it until the plants are well established in the beds; and the roots strike down into the dung by the spring, which makes their flowers stronger than usual: these beds should be exposed to the east, and screened from the north sun as much as is necessary.

In the spring following many of these flowers will shew; when such of them as have good properties should be selected, which should be removed, each of them into a pot of the same prepared earth, and preserved until the next season, at which time a judgment of the goodness of the flower may be formed; but those that produce plain-coloured or small flowers should be taken out, and planted in borders in the out parts of the garden, to make a show, or gather for nosegays, &c.; the others, which do not produce their flowers the same year, may be taken up and set out in a fresh bed, to remain till their properties are known.

In the second method, the offsets or slips may be taken from the old roots in the spring or autumn, and be planted into small pots filled with the same sort of earth as was directed for the seedlings, and during the summer season be

set in a shady place, and must be often gently refreshed with water, and in the autumn and winter be sheltered from violent rains. In the spring following these plants produce flowers, though but weak; therefore, soon after they are past flowering, they should be put into larger pots, and the second year they will blow in perfection.

In order to obtain a fine bloom of these flowers, the plants should be preserved from too much wet in winter, which often rots and spoils them, letting them have as much free open air as possible; but they should not be too much exposed to the sun, which is apt to forward their budding for flower too soon; and the frosty mornings, which often happen in March, thereby destroy their buds, if they are not protected; to prevent which, those who are curious in these flowers place their pots in autumn under a common hot-bed frame, where, in good weather, the plants may enjoy the full air, by drawing off the glasses; and in great rains, snow, or frost, be screened by covering them.

About the beginning of February, when the weather is mild, the upper part of the earth in the auricula pots should be taken off as low as can be, without disturbing their roots, filling up the pots with fresh rich earth, which greatly strengthens them for bloom. As those plants which have strong single heads always produce the largest clusters of flowers, the curious florist should pull off the offsets as soon as it can be done with safety to their growing, to encourage the mother plants to flower the stronger; they should also pinch off the flowers in autumn, where they are produced, and not suffer them to open, that the plants may not be weakened by it. The pots should be covered with mats in frosty weather, during the time of their budding for flower, lest the sharp mornings blight them, and prevent their blowing. When the flower stems begin to advance, and the blossom buds grow turgid, they must be protected from hasty rains, which would wash off their white mealy farina, and greatly deface the beauty of their flowers, keeping them as much uncovered as possible, otherwise their stems will be drawn up too weak to support their flowers, (which is often the case when their pots are placed near walls,) giving them gentle waterings to strengthen them, but none of the water should be let fall into the centre of the plant, or among the leaves.

When the flowers begin to open, their pots should be removed upon a stage (built with rows of shelves, one above another, and covered on the top, to preserve them from the wet: this should be open to the morning sun, but sheltered from the heat of the sun in the middle of the day): in this position they will appear to much greater advantage, than when they stand upon the ground; for their flowers being low, their beauty is hid; whereas, when they are advanced upon shelves, they are fully seen. In this situation they may remain until the beauty of their flowers is past, when they must be set abroad to receive the rains, and have open free air, in order to obtain seeds, which will fail if they are kept too long under shelter. When the seed is ripe, it should be gathered when it is perfectly dry, and exposed to the sun in a window upon papers to prevent its growing mouldy, letting it remain in the pods till the season for sowing.

It is observed by the editor of Miller's Dictionary, that those who are very nice in raising auriculas, direct the compost to be made of one-half rotten cow-dung two years old; one-sixth fresh found earth of an open texture; one-eighth earth of rotten leaves; one-twelfth coarse sea or river sand; one twenty-fourth soft decayed willow wood; one twenty-fourth peaty or moory earth; one twenty-fourth ashes of burnt vegetables; to be spread upon the surface of the

other ingredients. This compost is to be exposed to the sun and air, turned over once or twice, and passed as often through a coarse screen or sieve; then laid in a regular heap from fifteen to eighteen inches thick, and in this state remain a year, turning it over two or three times, and keeping it free from weeds. And it is added, that the pots for the auriculas should be hard baked: the inner diameter of the top to be six inches and a half, of the bottom four inches, and they should be about seven inches deep, for common-sized blooming plants: but smaller plants and offsets should have smaller shallower pots, and very large plants should have larger pots in proportion; the bottom should have a small degree of concavity, and the hole should be half an inch in diameter: the rims should project about half an inch, in order to take up and remove them with greater ease and safety. The pots should be buried in wet earth, or immersed in water three or four days, or a week before they are wanted, to take off their absorbent property.

In the after-management of the plants, they should be potted annually soon after bloom; curtailing their fibres, if grown very long, and cutting off the lower part of the main root if too long or decayed. The offsets at this season strike freely, and become well established before winter. The plants should be carefully examined, and where any unsoundness appears, be cut out entirely with a sharp penknife, exposing the wounded part to the sun, and when it is quite dry, applying a cement of bees'-wax and pitch in equal quantities, softened in the sun or before a fire. If the lower leaves be yellow or dried up, they should be stripped off in a direction downwards. Having put the hollow shell of an oyster over the hole of the pot, three parts of it should be filled with compost, highest in the middle, placing the plant there, with its fibres regularly distributed all round; then filling the pot with the compost, adding a little clean coarse sand close round the stem on the surface, and striking the bottom of the pot against the ground or table to settle the earth. The true depth of planting is within half an inch of the lowest leaves, as the most valuable fibres proceed from that part; and the offsets will be thereby encouraged to strike root sooner. When these have formed one or more fibres of an inch or two in length, they may, by means of a piece of hard wood, or by the fingers, be separated with safety, and planted round the sides of a small pot, filled with the same compost, till they are sufficiently grown to occupy each a separate pot: if a small hand-glass be placed over each pot it will cause the fibres to grow more rapidly; but if it be long continued, it will draw up and weaken the plants. And in the beginning of May, as soon as the operation of potting is finished, the plants should be placed in an airy shaded situation, but not under the drip of trees. Here they may remain till September or October, when they should be removed into shelter.

The plants should, in the first favourable weather in February, be divested of their decayed leaves; and by the middle of that month earthing them up; that is, taking away the superficial mould of the pots about an inch deep, and putting in fresh compost, with the addition of a little loam, to give it more tenacity. This contributes greatly to the strength of the plants, and the vigour of their bloom; at the same time it affords a favourable opportunity to separate such offsets as appear to have sufficient fibre to be taken off at this early season. The pots with these offsets should be placed in a frame, in a sheltered situation, till their roots are established. Though frost, unless it be very rigorous, will not destroy the plants, it will injure them

and perhaps spoil the bloom, especially early in the spring; they should therefore be covered with mats in a severe season. When any plant has more than one or two principal stems, it is advisable to pinch off the smallest and weakest, in order to render the blossoms of that which remains larger and more vigorous. And when the flowers (pips) become more turgid and begin to expand, the plants should be selected from the rest, removing them to a calm shady corner, suspending small hand-glasses over them.

In this culture the stages for the pots to stand on whilst in bloom should have a northern aspect, and should consist of four or five rows of shelves, rising one above another, the roof being covered with frames of glass; the tallest blowing plants being placed behind, and the shortest in front. The plants must be regularly watered two or three times every week during the blooming season.

All these plants are highly ornamental; the former in beds and borders, and the latter sorts among curious potted flowering plants.

PRIMUM ENS. See ENS.

PRIMUM Mobile. See MOBILE.

PRIMUS *Brachii Moventium*, in *Anatomy*, a name given by Vesalius, and some others who have copied from him, to a muscle generally known under the name of the pectoralis.

PRIMUS *Communium Laryngis*, a name given by Casserius and some others to the muscle more generally known by the name of sterno-thyroidæus, or sterno-thyroides.

PRIMUS *Hyoidis Ossis Musculus*, a name given by Fallopius and some others to the muscle of the os hyoides, called by Albinus sterno-hyoidæus.

PRIMUS *Oculum Movens*, a name given by Vesalius to one of the four muscoli recti of the eye, called by Albinus and others the adductor. It is called by Fabricius the rectus inferior, and by some the bibitorius.

PRIMUS *Propriorum Auriculæ Musculus*, a name given by Casserius to one of the muscles of the head, called by Albinus the auriculam attollens, and by Cowper and Winslow superior auriculæ.

PRIMUS *Peronæus*. See PERONÆUS.

PRIMUS *Scalenus*. See SCALENUS.

PRINCE, PRINCEPS, in *Politics*, a person invested with the supreme command of a state or country, independent of any superior.

PRINCE is also used for a person who is sovereign in his own territory; yet holds of some other, as his superior or lord, and pays homage or tribute to him.

Thus all the princes of Germany are feudatories of the emperor: they are as absolute in their respective principalities as the emperor himself; yet are all bound in certain services to him.

PRINCE, in *Ancient Records*, frequently signifies no more than lord. Du-Cange gives a great number of instances of this usage.

In effect, the word *princeps* in Latin, whence *prince* in English, originally signifies only the *chief*, or *first*: it is compounded of the Latin *primus*, and *caput*; and is properly a word of dignity and office, not of property and sovereignty.

Thus in the charter of king Offa, after the bishops had subscribed their names, we read *Brordanus patritius*, *Binnanus princeps*; and afterwards the dukes subscribed their names.

And in the charter of king Edgar, in *Mon. Angl.* tom. iii. p. 301. "Ego Edgarus rex rogatus ab episcopo meo Deorwolfe, & principe meo Aldredo, &c." And in

Mat. Paris, p. 155. "Ego Halden princeps regis pro vieribus assensum præleo, & ego Turketillus dux concedo."

PRINCE of the Senate. There was one member of the Roman senate distinguished always from the rest by the title of "prince of the senate." This title was given of course to that person whose name was called over the first in the roll of the senate, whenever it was renewed by the censors. He was always one of consular and censorian dignity.

After the institution of the censors, it became a custom to confer this title of "prince of the senate" on the oldest senator then living of censorian dignity. Yet there were no peculiar rights annexed to this title, nor any other advantage, except an accession of authority, from a notion which it would naturally imprint of a superior merit in those who bore it. See SENATE.

PRINCE of the Waters, an officer of state in Persia. The number of wells and subterraneous pits, which were objects of peculiar attention in the reign of Nushirvan, or Chosroes, so that fresh water was skilfully dispersed over the arid territory of this country, is much diminished in later times, and of course the fertility of the soil. Four hundred wells, as we learn from Chardin and Tavernier, have been recently lost near Tauris, and 42,000 were once reckoned in the province of Khorafan.

PRINCE of the Youth. Among the ancient Romans, it was the custom for the emperor in his life-time to nominate him whom he would have to succeed in the empire, under the title of *princeps juventutis*, & *Cæsar*.

In the ludus Trojanus, the youth who was chosen captain, was also called *princeps juventutis*.

PRINCE is also a title given to the issue of princes, or those of the royal family.

In which sense they are called, particularly in France, *princes of the blood*; as partaking of the blood to which the sovereignty is appropriated: and not by any hereditary right, but as a patrimony substituted to all the royal race.

In England, the king's children are called *sons and daughters of England*: the eldest son is created *prince of Wales*. The cadets, or younger, are created dukes or earls, with what title the king pleases. They have no appendages, as in the former constitution of France; but only what the good pleasure of the king and parliament bestow on them.

The sons are all by birth counsellors of state: and the daughters are all styled *princesses*; to violate the eldest of which, unmarried, is at this day high treason. See MARRIAGE and PREMUNIRE.

To all the king's children belongs the title of *royal highness*: all subjects are to kneel, when admitted to kiss their hand; and at table, out of the king's presence, they are served on the knee. The youngest sons and daughters of the king who are not in the line of succession, have precedence before all peers and public officers, as well ecclesiastical as temporal. 31 Hen. VIII. cap. 10.

The first prince of the blood in France was, under the old government, called absolutely *monsieur le prince*. The quality of prince of the blood gave a rank and precedence, but it did not include any jurisdiction; they were princes by order, not by office.

Wicquefort observes, that it was not more than fifty years from his time that the princes of the blood of France gave place to all ambassadors, even those of republics; and it was at the king's request, that they were since allowed the precedence.

The moment a pope is elected, all his relations become princes.

PRINCE of *Wales*, the eldest son of England.

He is born duke of Cornwall; and immediately intitled to all the rights, revenues, &c. belonging thereto; as being deemed in law at full age on his birth-day.

He is afterwards created prince of Wales, and earl of Chester; the investiture of which is performed by imposition of a cap of state, and a coronet, a verge of gold, and a ring. He holds the principality by patent granted him and his heirs, by the kings of England.

The title and principality were first given by king Edw. I. to his eldest son: till that time the eldest son of England was called *lord prince*. While Normandy remained to the king of England, the eldest son was always styled duke of Normandy: since the union, his title is *Magna Britannie princeps*.

He is reputed in law the same person with the king: to imagine his death, or to violate his wife, and also the princess royal, or eldest daughter of the king, is high treason by stat. 25 Edw. III., as much as to conspire the death of the king, or violate the chastity of the queen. The reason of which is, that the prince of Wales is next in succession to the crown, and to violate his wife might taint the blood royal with bastardy; and the eldest daughter of the king is also alone inheritable to the crown, on failure of male issue, and therefore more respected by the laws than any of her younger sisters; insomuch that upon this, united with other (feodal) principles, while our military tenures were in force, the king might levy an aid for marrying his eldest daughter, and her only.

His revenues, as duke of Cornwall, have been computed at 14,000*l. per annum*. The revenues of the principality were estimated, three hundred and fifty years ago, at 4680*l. per annum*.

PRINCE of *Pleasantry*, *prince de plaisir*, in the *Customs of Flanders*. See SPORTS.

PRINCE of the *Horse-comb*. See SPORTS.

PRINCE'S *Feather*, in *Gardening*, the common name of a beautiful flower plant. See AMARANTHUS.

PRINCE'S *Wood*. See CORDIA and HAMELIA.

PRINCE'S *Bay*, in *Geography*, a bay on the S. coast of Staten island, New York.—Also, a bay called “Barawally,” on the W. of the island of St. Vincent; two miles S. of Cumberland bay.

PRINCE'S *Island*, an island in the Atlantic, near the coast of Africa, 90 miles in circumference, deriving its name from the assignment of its revenues to the prince of Portugal; discovered in the year 1471. The land is high and fertile, producing chiefly rice, tobacco, millet, oranges, lemons, bananas, cocoa, sugar-canes, manioc, and grapes; and the air is salubrious. The town, which lies on the N. coast, contains about 200 houses, and has a good harbour. N. lat. 2° 50'. E. long. 7° 10'.—Also, an island in the East Indian sea, visited by European ships for wood and water. It is subject to the king of Bantam. The Malays call it “Pulo Selan,” but by the inhabitants it is denominated “Pulo Paneitan.” It lies at the W. entrance of the straits of Sunda. Captain Cook, who visited it in 1771, gives the following account of it. It is woody and very small, part only has been cleared: there is no remarkable hill upon it, yet the English call the small eminence which is just over the landing-place, “The Pike.” It was formerly much frequented by the Indian ships of many nations, but especially those of England, which of late have forsaken it, as it is said, because the water is bad, and touch either at North island, a small island that lies on the coast of Sumatra, without the east entrance of the strait, or at New Bay, which lies only a few leagues from Prince's island; at neither of which places any considerable quantity of

other refreshments can be procured. Prince's island is, upon the whole, certainly more eligible than either of them; and though the water is brackish, if it be filled at the lower part of the brook, yet higher up it may be found excellent. The first and second, and perhaps the third ship that comes in the season, may be tolerably supplied with turtle; but those coming afterwards must be content with small ones. Cocoa-nuts were bought at the rate of 100 for a dollar, if they were picked, and if taken promiscuously, 150. Plantains he found in great plenty, also some pine apples, water melons, jaccas, and pumpkins, besides rice, the greater part of which was of the mountain kind, that grows in dry land. The inhabitants are Javanese, whose rajah is subject to the sultan of Bantam. Their customs are very similar to those of the Indians about Batavia; but they seem to be more jealous of their women. They profess the Mahometan religion. The houses of their town are built upon piles or pillars, four or five feet above the ground; upon these is laid a floor of bamboo-canes, which are placed at some distance from each other, so as to leave a free passage for the air from below; the walls also are of bamboo, which are interwoven hurdlewise, with small sticks that are fastened perpendicularly to the beams, which form the frame of the building. The disposition of the people, as far as they could discover it, is good. They dealt honestly, except that, like all other Indians, and the itinerant retailers of fish in London, they asked sometimes twice, and sometimes thrice as much for their commodities as they would take. They all speak the Malay language, though they have a language of their own, different both from the Malay and the Javanese. Their own language they call Catta Gunung, the language of the mountains; and they say that it is spoken upon the mountains of Java, whence their tribe originally migrated. E. long. 104°. S. lat. 6° 41'.

PRINCE'S *Islands*. See PAPAS *Adass*, and PRINKIPOS.

PRINCE *Charles's Island*, a small island in the North sea, near the W. coast of Spitzbergen.

PRINCE *Edward's Island*. See St. JOHN.

PRINCE *Edward's Islands*, two islands in the Indian sea, discovered in the year 1772, by captains Marion du Fresne and Crozet, French navigators, on their passage from the Cape of Good Hope to the Philippine islands. Captain Cook sailed between them in 1776, and gave them their present name, in honour of prince Edward, our sovereign's fourth son. Their distance from one another is about 15 miles. Captain Cook's account is as follows: we passed through this channel at equal distance from both islands; and could not discover, by the assistance of our best glasses, either tree or shrub on either of them; they seemed to have a rocky and bold shore; and excepting the south-east part, where the land is rather low and flat, a surface composed of barren mountains, which rise to a considerable height, and whose summits and sides were covered with snow, which in many places seemed to be of a considerable depth; the south-east parts had a much greater quantity on them than the rest; owing, probably, to the sun acting for a less space of time on these, than on the north and north-west parts. The ground, where it was not hid by the snow, from the various shades it exhibited, may be supposed to be covered with moss or coarse grass. On the north side of each of the islands is a detached rock: that near the south island is shaped like a tower, and seemed to be at some distance from the shore. As we passed along, a quantity of sea-weed was seen, and the colour of the water indicated soundings; but there was no appearance of an inlet, unless near the rock just mentioned; and that, from its smallness, did not promise a good anchoring-place. That which lies most to the south, and is also the largest,

we judged to be about 45 miles in circuit ; and to be in S. lat. $46^{\circ} 53'$. E. long. $37^{\circ} 46'$. The most northerly one is about 27 miles in circuit, and lies in S. lat. $46^{\circ} 40'$. E. long. $38^{\circ} 8'$.

PRINCE Edward, a county of Virginia, between the Blue Ridge and the tide waters, containing 12,409 inhabitants. Hampden Sydney college is in this county, the building of which is large enough to accommodate 60 students. The principal rivers are the Buffaloe, Biscay, and Bush. On the N. side, towards the middle, bordering on the Appamatox, the soil is of a good quality ; the W. and S. parts are less fertile. This county contains three Episcopal, three Presbyterian, three Baptist, and one Methodist churches. The court-house is 50 miles from Lynchbury, and 358 from Philadelphia.

PRINCE Edward, a county of Canada, bounded S. by lake Ontario, W. by the carrying place or the isthmus of the Presque Isle de Quinté, N. by the bay of Quinté, and E. from Point Pleasant to Point Traverse, by its several shores and bays. This county comprehends all the islands in lake Ontario, and the adjacent bay of Quinté.

PRINCE Edward's Isles. See WASHINGTON'S *Isles*.

PRINCE Ernest's Sound, an inlet which branches off from the Duke of Clarence's strait, and separates the S.E. coast of the Duke of York's island from the continent of America. The S.W. entrance is between Point Onslow and Point Le Mesurier.

PRINCE Frederick, the chief town of Calvert county, Maryland ; 3 miles S. of Huntingtown.

PRINCE Frederick's Sound, an inlet on the North Pacific ocean, on the west coast of North America ; so named by captain Vancouver, in honour of his royal highness Frederick, duke of York. It extends eastward from Chatham strait to the continent. About 42 miles to the north are Admiralty island, Stephens's passage, and a part of the continent ; and on the south are some large islands. N. lat. $56^{\circ} 52'$ to $57^{\circ} 12'$. E. long. $225^{\circ} 42'$ to $227^{\circ} 20'$.

PRINCE George, a county of Virginia, bounded north by James river, which washes about 35 miles of it, in medial breadth 16 miles, containing 8050 inhabitants, five episcopal churches, one meeting for Friends, and several meetings for Methodists, and some for Baptists. This is a fertile county, and abounds with wheat, corn, flax, cotton, and tobacco. Its timber consists of various kinds of oak, of good quality, and fit for ship-building. It has also abundance of wild grapes, flowering shrubs, sarsaparilla, snake-root, and ginseng. Its peaches are finely flavoured ; the almond and fig trees grow in the open air. Large quantities of pork and bacon are cured here, and form the principal food of the inhabitants. Its veal is good, but mutton indifferent ; its poultry is good and abundant. The winters are short, and generally pleasant ; and the country cannot be considered unhealthy.

PRINCE George, a county also of Maryland, on the west shore of Chesapeake bay, between Patowmac and Patuxet rivers. The eastern corner of the territory of Columbia borders on the west part of this county. It contains 20,589 inhabitants.

PRINCE Rupert's Bay, a bay on the north-west coast of the island of Dominica, which is deep, capacious, and sandy, and affords excellent shelter from the winds. On this bay is situated the town of Portsmouth, north of which is a cape called "Prince Rupert's Head." N. lat. $15^{\circ} 42'$. W. long. $61^{\circ} 31'$.

PRINCE Town. See PRINCETON.

PRINCE of Wales's Archipelago, a large island in the North Pacific ocean, with a number of small ones in the bays on

its coast, so called by captain Vancouver ; extending about 110 miles in length from north-west to south-east, and from 30 to 40 in breadth. N. lat. $54^{\circ} 42'$ to $56^{\circ} 21'$. E. long. $226^{\circ} 20'$ to $228^{\circ} 26'$.

PRINCE of Wales's Island, an island in the South Pacific ocean, observed by captain Byron in 1765, and judged to be about 60 miles long, narrow, and low, and abounding with inhabitants. S. lat. 15° . W. long. $151^{\circ} 53'$.

PRINCE of Wales's Foreland, a cape on the east coast of Kerguelen's land. S. lat. $49^{\circ} 39'$. E. long. $72^{\circ} 22'$.—Also, the most southerly point of New Caledonia, in the South Pacific ocean. S. lat. $22^{\circ} 29'$. E. long. $166^{\circ} 57'$.

PRINCE of Wales's Fort, a fort and factory, on Churchill river, belonging to the Hudson Bay Company. N. lat. $58^{\circ} 47'$. W. long. $94^{\circ} 7'$. The mean heat here is $18^{\circ} 7'$; the least -18° , and greatest 85° .

PRINCE of Wales's Islands, a cluster of islands, supposed to extend from New Holland to New Guinea, differing in elevation and compass, many of which are well covered with herbage and wood. Captain Cook saw on most of them smoke, and thence inferred that they were inhabited. Between these are probably good sailing passages.

PRINCE of Wales's Lake, a lake of North America. N. lat. $50^{\circ} 55'$. W. long. 94° .

PRINCE William, a county of Virginia, bounded west by Farquier, and east by Patowmac river, which separates it from Maryland ; containing 11,311 inhabitants.

PRINCE William Henry's Island, an island in the South Pacific ocean, discovered by captain Wallis, on the 13th of June 1767. S. lat. 19° . W. long. $141^{\circ} 6'$.—Also, an island in the Pacific ocean, discovered, in 1790, by lieutenant Ball, commander of the Supply. It is elevated, and about 70 miles in circumference ; well wooded, interspersed with cultivated tracts of ground, on which was perceived something that had the appearance of Indian corn, or sugar-cane. It is surrounded by a sandy beach, on which were seen several canoes, and also several of the natives. Several houses were perceived among the trees, and appeared to be large and well constructed. The appearance of the island is luxuriant and picturesque, and it is thought to be very fertile and well peopled. The natives were wholly naked, and seemed to be the same sort of people that had been seen at Tench's island. S. lat. $1^{\circ} 32'$. E. long. $149^{\circ} 30'$.

PRINCE William's Islands, a cluster of islands in the Pacific ocean, discovered by Tasman in 1643. S. lat. $17^{\circ} 19'$. E. long. 179° .

PRINCE William's Sound, an inlet of the North Pacific ocean, occupying at least $1\frac{1}{2}^{\circ}$ of latitude, and 2° of longitude, exclusive of its arms and branches, which are not ascertained. Captain Cook, who discovered it in 1778, gives the following account of it. The natives, who came to make them several visits while they were in the sound, were generally not above the common height, though many of them were under it. They were square or strong chested ; and the most disproportioned part of their body seemed to be their heads, which were very large, with thick short necks, and large, broad, or spreading faces, which, upon the whole, were flat. Their eyes, though not small, scarcely bore a proportionate size to their faces ; and their noses had full round points, hooked and turned up at the tip. Their teeth were broad, white, equal in size, and evenly set. Their hair was black, thick, straight, and strong ; and their beards, in general, thin or wanting ; but the hairs about the lips of those who had them were stiff or bristly, and frequently of a brown colour ; and several of the elderly men had even large and thick, but straight beards. Their com-

mon drefs (for men, women, and children, are clothed alike) is a kind of clofe frock, or rather robe, reaching generally to the ankles, though fometimes only to the knees. At the upper part is a hole, juft fufficient to admit the head, with sleeves that reach to the wrift. Thefe frocks are made of the skins of different animals; the moft common of which are the fea-otter, grey fox, racoon, and pine martin; with many of feal skins, and, in general, they are worn with the hairy fide outward. Some alfo have thefe frocks made of the skin of fowls, with only the down remaining on them, which they glue on other fubftances; and we faw one or two woollen garments, like thofe of Nootka. In general, they do not cover their legs or feet; but a few have a kind of fkin ftockings, which reach half way up to the thigh; and fcarcely any of them are without mittens for their hands, made of the skins of bears' paws. Thofe who wear any thing on their heads, refembled in this refpect our friends at Nootka, having high truncated conic caps, made of ftraw, and fometimes of wood, refembling a feal's head, and well painted. The men commonly wear the hair cropt round the neck and forehead; but the women allow it to grow long, and moft of them tie a fmall lock of it on the crown; or a few club it behind, after our manner. Both fexes have the ears perforated with feveral holes, about the outer and lower part of the edge, in which they hang little bunches of beads, made of the fame tubulous fhelly fubftance ufed for this purpofe by thofe of Nootka. The feptum of the nofe is alfo perforated; through which they frequently thruft the quill-feathers of fmall birds, or little bending ornaments, made of the above fhelly fubftance, ftung on a ftiff ft ring, or cord, three or four inches long, which gives them a truly grotesque appearance. But the moft uncommon and unfightly ornamental fafhion, adopted by fome of both fexes, is their having their under lip fplit, or cut quite through, in the direktion of the mouth, a little below the fwell part. This incifion, which is made even in the fucking children, is often above two inches long; and either by its natural retraction, when the wound is frefh, or by the repetition of fome artificial management, affumes the true fhape of lips, and becomes fo large, as to admit the tongue through. The food which we faw them eat was dried fifh, and the flefh of fome animal, either broiled or roasted. Some of the latter that was brought feemed to be bear's flefh, but with a fifhy tafte. As to the animals of this part of the continent, the fame muft be underftood as of thofe at Nootka; that is, the knowledge we have of them is entirely taken from the skins which the natives brought to fell. Thefe were chiefly of feals, a few foxes, the whitifh cat or lynx, common and pine martins, fmall ermines, bears, racoons, and fea-otters; of thefe the moft common are the martin, racoon, and fea-otter, which compofed the ordinary drefs of the natives. Of the birds mentioned at Nootka, we found here only the white-headed eagle, the fhag, the alcyon, or great king-fifher, which had very fine bright colours; and the humming-bird, which came frequently and flew about the fhip, while at anchor, though it can fcarcely live here in the winter, which muft be very fevere. The water-fowls were geefe, a fmall fort of duck, and fome black fea-pyes, with red bills, which were found at Van Diemen's land and New Zealand. The metals we faw were copper and iron, both in plenty. Few vegetables of any kind were feen; and the trees which chiefly grew here were the Canadian and fpruce pine, and fome of them tolerably large. Captain Vancouver vifited this found in 1794, and fays, after a minute examination we were empowered to make of Prince William's found, we were not only made acquainted with its utmoft limits in every direc-

tion, but proved it to be a branch of the ocean that requires the greateft circumfpection to navigate; and although it diverges into many extenfive arms, yet none of them can be confidered as commodious harbours, on account of the rocks and fhoals that obftrudt the approach to them, or of the very great depth of water at or about their entrances; of the former innumerable have been difcovered, and there is great reafon to fuppofe that many others may have exiftence, of which we gained no knowledge. By what may be collected from our inquiries, Snug-corner cove, and the paffage to it from the ocean, feem to be the leaft liable to thefe objections of all places of fhelter which the found affords. N. lat. 20° to 61°. W. long. 147°.

PRINCES, *College of*. See COLLEGE.

PRINCESS ANNE, in *Geography*, a maritime county of Virginia, bounded W. by Norfolk county, S. by North Carolina, and N. by Chafapeak bay, 30 miles long, 29 broad, containing 9498 inhabitants.—Alfo, a poft-town of Maryland, on the eaft fhore of Chafapeak bay, in Somerfet county, on the eaft fide of Monokin river; 178 miles S. by W. from Philadelphia. N. lat. 38° 10'. W. long. 75° 48'.

PRINCESS *Royal's Harbour*, a harbour on the fouth-weft coaft of New Holland, and the weftern part of King George Third's found. The paffage into it is about a quarter of a mile wide; the depth near the northern fhore is 5 or 6 fathoms, but on the fouthern not more than 2½ and 3 fathoms, on account of banks of coral-rock that are very vifible, but not dangerous, as they are not liable to any violent agitation of the fea. Within the points of entrance the depth is regularly from 4 to 7 fathoms, and the bottom is clear good holding ground. This depth, occupying only part of the harbour, affords fufficient fpace for feveral vefels to ride in fafety. S. lat. 35° 8'. E. long. 118° 9'.

PRINCESSE, in *Ichthyology*. See CHÆTODON *Vagabundus*.

PRINCETON, in *Geography*, a township of Worcefter county, Maffachufetts, 15 miles N. by W. of Worcefter, and 52 W. by N. of Boston. This township contains 19,000 acres of high and hilly, but ftong and rich land, adapted to grafs and grain. Its principal productions are excellent beef, butter, and cheefe. Here is a handsome congregational church, feated on a high hill, and commanding a moft extenfive and rich profpect of the furrounding country. Wackufett mountain, the moft noted in the ftate, is in the north part of this township. The town has a valuable library, was incorporated in 1759, and contains 1062 inhabitants.

PRINCETON, a poft-town of New Jerfey, fituated partly in Middlefex and partly in Somerfet counties. Here are Naffau-Hall college (fee COLLEGE), about 80 dwelling houfes, and a brick Prefbyterian church. It is diftant 12 miles N.E. from Trenton, and 42 N.E. from Philadelphia. N. lat. 40° 22' 12". W. long. 74° 34' 45".—Alfo, a fmall poft-town of North Carolina; 35 miles from Halifax.

PRINCIPAL, PRINCIPALIS, the chief, moft confiderable, or neceffary part of a thing.

Thus we fay, the mayor is the principal magiftrate of a city or town; a council of war confifts of the principal officers. In the peroration, the principal points infifted on are to be briefly fummed up. The principal of a college or hall is the mafter of it.

PRINCIPAL, in *Commerce*, is the capital of a fum due or lent; in which fenfe the word is ufed in oppofition to intereft.

PRINCIPAL is alfo ufed for the firft fund or fum put by partners

else. There is, however, a difference of opinion concerning these first principles; some admitting them to be self-evident, others proving them by arguments, and others again totally denying them. Before the time of Descartes, it was assumed as a first principle, that the sun and moon, and earth and sea, have a real existence, whether we think of them or not. Descartes thought that their existence should be proved by argument; in which opinion he has been followed by Malebranche, Arnauld, and Locke. They have endeavoured to prove by reasoning the existence of external objects of sense; and Berkeley and Hume, conceiving their arguments to be feeble and unsatisfactory, have been led to deny their existence altogether. The ancient philosophers granted, that all knowledge must be grounded on first principles; and the Peripatetic philosophy admitted a great number of them, erring perhaps in excess rather than in defect. Descartes was satisfied with one principle, expressed in one word, "cogito," I think. Mr. Locke seems to have thought them of very little use.

In order to obtain some mark or criterion by which first principles, that are really such, may be distinguished from others that assume this character without a just title, Dr. Reid makes the following observations. 1. "I hold it to be certain," he says, "and even demonstrable, that all knowledge got by reasoning must be built upon first principles. 2. Some first principles yield conclusions that are certain, others such as are probable in various degrees, from the highest probability to the lowest. 3. It would contribute greatly to the stability of human knowledge, and consequently to the improvement of it, if the first principles upon which the various parts of it are grounded, were pointed out and ascertained. 4. Nature hath not left us destitute of means by which the candid and honest part of mankind may be brought to unanimity, where they happen to differ about first principles.

First principles may relate either to the class of *contingent*, or to that of *necessary* truths. Those of the first class comprehend, according to Dr. Reid's enumeration, such as follow. 1. The existence of every thing of which he is conscious. Mr. Hume, it is said, after annihilating body and mind, time and space, action and causation, and even his own mind, acknowledges the reality of the thoughts, sensations, and passions of which he is conscious. (See CONSCIOUSNESS.) 2. Another first principle is, that the thoughts of which, says Dr. Reid, I am conscious, are the thoughts of a being, which I call *myself*, *my mind*, *my person*. (See IDENTITY.) 3. Those things did really happen which are distinctly remembered. (See MEMORY.) 4. Another first principle is our own personal identity and continued existence, as far back as we remember any thing distinctly. 5. Those things do really exist which we distinctly perceive by our senses, and are what we perceive them to be. 6. That we have some degree of power over our own actions, and the determinations of our will. This is implied in every act of volition, in all deliberation, in every purpose or resolution formed in consequence of deliberation, and in every promise or contract in which a man plights his faith. 7. That the natural faculties, by which we distinguish truth from error, are not fallacious. 8. There is life and intelligence in our fellow-men with whom we converse. 9. Certain features of the countenance, sounds of the voice, and gestures of the body, indicate certain thoughts and dispositions of the mind. 10. A certain regard is due to human testimony in matters of fact, and even to human authority in matters of opinion. 11. There are many events depending upon the will of man, in which there is a self-evident probability, greater or less, according to circumstances.

12. In the phenomena of nature, what is to be will probably be like to what has been in similar circumstances.

The first principles of *necessary* truths are divided by Dr. Reid into different classes, according to the sciences to which they belong; and he mentions some, in each class, by way of specimen. 1. Some of these may be called grammatical, such as, that every complete sentence must have a verb. 2. Some are logical, such as, that every proposition is either true or false, that reasoning in a circle proves nothing, &c. 3. Some are mathematical. (See AXIOMS.) 4. In matters of taste, there are also axioms, or common principles. (See TASTE.) 5. There are also first principles in morals; such are the following, *viz.* that no man ought to be blamed for what it was not in his power to hinder, that we should do to others what we should expect them to do to us in the same circumstances, &c. (See MORAL PHILOSOPHY and MORAL SENSE.) 6. Some first principles are metaphysical; such are the following, *viz.* that the qualities which we perceive by our senses must have a subject, which we call body; and that the thoughts of which we are conscious must have a subject, which we call mind: that whatever begins to exist must have a cause which produced it (see CAUSE); and that design and intelligence in the cause may be inferred, with certainty, from marks or signs of it in the effect. All these three principles are denied by Mr. Hume; others think that they admit of proof by reasoning, or from experience; but all must allow their truth and importance. On the last of the three principles above mentioned, we shall refer to the articles *Final Cause* and *GOD*; and, moreover, cite an appropriate passage from archbishop Tillotson's sermons, vol. i. serm. i. "For I appeal to any man of reason," says the excellent preacher, "whether any thing can be more unreasonable, than obstinately to impute an effect to chance, which carries in the very face of it all the arguments and characters of a wise design and contrivance? Was ever any considerable work, in which there was required a great variety of parts, and a regular and orderly disposition of those parts, done by chance? Will chance fit means to ends, and that in ten thousand instances, and not fail in any one? How often might a man, after he had jumbled a set of letters in a bag, fling them out upon the ground, before they would fall into an exact poem; yea, or so much as make a good discourse in prose? And may not a little book be as easily made by chance, as this great volume of the world? How long might a man be in sprinkling colours upon canvas with a careless hand, before they would happen to make the exact picture of a man? And is a man easier made by chance than his picture? How long might twenty thousand blind men, which should be sent out from the several remote parts of England, wander up and down before they would all meet upon Salisbury-plain, and fall into rank and file in the exact order of an army? And yet this is much more easy to be imagined, than how the innumerable blind parts of matter should rendezvous themselves into a world. A man that sees Henry the Seventh's chapel at Westminster might with as good reason maintain, (yea, with much better, considering the vast difference betwixt that little structure and the huge fabric of the world,) that it was never contrived or built by any man, but that the stones did by chance grow into those curious figures into which they seem to have been cut and graven; and that upon a time, (as tales usually begin,) the materials of that building, the stone, mortar, timber, iron, lead, and glass, happily met together, and very fortunately ranged themselves into that delicate order in which we see them now so close compacted, that it must be a very great chance that parts them again. What would the world think of a man that

that should advance such an opinion as this, and write a book for it? If they would do him right, they ought to look upon him as mad: but yet with a little more reason than any man can have to say that the world was made by chance; or that the first men grew up out of the earth as plants do now. For can any thing be more ridiculous and against all reason, than to ascribe the production of men to the first fruitfulness of the earth, without so much as one instance and experiment in any age or history to countenance so monstrous a supposition? The thing is at first sight so gross and palpable, that no discourse about it can make it more apparent. And yet these shameful beggars of principles, who give this precarious account of the original of things, assume to themselves to be the men of reason, the great wits of the world, the only cautious and wary persons that hate to be imposed upon, that must have convincing evidence for every thing, and can admit of nothing without a clear demonstration for it."

Dr. Reid is of opinion, that the principle, so admirably illustrated in the passage now cited, *viz.* that from certain signs or indications in the effect we may infer, that there must have been intelligence, wisdom, or other intellectual or moral qualities in the cause, is gained neither by reasoning nor by experience; and, therefore, if it be a true principle, it must be a first principle. There is, he says, in the human understanding a light, by which we see immediately the evidence of it, when there is occasion to apply it. Whether it be in his sense, the true and first principle or not, it is unquestionable, that the clear signatures of wisdom, power, and goodness, in the constitution and government of the world, afford an argument for the being and providence of the Deity, that in all ages has made the strongest impression upon candid and thinking minds; an argument which has this peculiar advantage, that it acquires strength as human knowledge advances, and is more convincing at present than it was some centuries ago. On this account, those who, in all ages, have been unfriendly to the principles of religion, have made attempts to weaken the force of the argument, which is founded on the principle above stated. This argument has been denominated the argument from final causes; and when reduced to a syllogism, it comprehends these two premises: *first*, that design and intelligence in the cause may, with certainty, be inferred from marks or signs of it in the effect. This may be considered as the *major* proposition of the argument. The *second*, which may be called the *minor* proposition, is, that there are in fact the clearest marks of design and wisdom in the works of nature; and the conclusion is, that the works of nature are the effects of a wise and intelligent Cause. A person must either assent to the conclusion, or deny one or other of the premises. Those, among the ancients, who denied a God or a Providence, seem to have allowed the *major* proposition, and to have denied the *minor*. An instance to this purpose occurs in the reasoning of Cotta the academic, in the third book of Cicero, of the nature of the Gods. In later times, those, who are dissatisfied with this argument from final causes, have quitted the strong hold of the ancient atheists, which had become untenable, and have chosen rather to make a defence against the *major* proposition. Descartes, although he was no atheist, seems to have led the way. Having invented some new arguments for the being of God, he was perhaps induced to disparage those that had been used before, that he might secure greater credit to his own; or, perhaps, he was offended with the Peripatetics, because they often mixed final causes with physical, in order to account for the phenomena of nature. He therefore maintained, that physical causes only should be assigned for phe-

nomena; that the philosopher has nothing to do with final causes; and that it is presumption in us to pretend to determine for what end any work of nature is formed. After the example of Descartes, some of his followers have manifested a contempt of all reasoning from final causes. Among these we may reckon Maupertuis and Buffon. But the most direct attack has been made upon this principle by Mr. Hume, who puts an argument in the mouth of an Epicurean, on which he seems to lay great stress. The argument is, that the universe is a singular effect, and therefore we can draw no conclusion from it, whether it may have been made by wisdom or not. Mr. Hume's reasoning is founded on the supposition, that our inferring design from the strongest marks of it is entirely owing to our past experience of having always found these two things conjoined. Dr. Reid has laboured to prove, that this is not the case; and he alleges, that, according to this reasoning, we can have no evidence of mind or design in any of our fellow men; and, moreover, that the man who maintains, that there is no force in the argument from final causes, must, if he will be consistent, see no evidence of the existence of any intelligent being but himself.

Aristotle, in his second book upon demonstration, has treated very fully concerning first principles, and clearly shewn, that all demonstration must be built upon truths which are evident of themselves, but cannot be demonstrated. Whilst the philosophy of Aristotle prevailed, it was held as a fixed point, that all proof must be drawn from principles already known and granted. The Peripatetic philosophers, however, adopted, as first principles, many vulgar prejudices and rash judgments. Among the ancients no opposition was made to first principles. But when the authority of the Peripatetic system terminated, and the revolution by Descartes took place, this great reformer of philosophy, cautious to avoid the snare in which Aristotle was taken, of admitting things as first principles too rashly, resolved to doubt of every thing, and to withhold his assent, unless it was forced by the clearest evidence. At length, however, he emerged from universal scepticism by the short enthymeme, "cogito ergo sum." This enthymeme consists of an antecedent proposition, *I think*, and a conclusion drawn from it, *therefore I exist*. For the truth of the antecedent proposition, Descartes trusted to the testimony of consciousness. Being conscious that he thought, he needed no other argument. Hence it appears, that we find it impossible to doubt of things of which we are conscious: the constitution of our nature forces this belief upon us irresistibly; and, therefore, Descartes is justified in assuming, as a first principle, the existence of thought, of which he was conscious. From the existence of his thought he infers his own existence; and thus he assumes another first principle, not a contingent but a necessary one, *viz.* that where thought is, there must be a thinking being or mind. Hence he proceeds to prove the existence of a supreme and infinitely perfect Being; and from the perfection of the Deity, he infers that his senses, his memory, and the other faculties which God had given him, were not fallacious. From this principle he deduced the existence of a material world, and of what we perceive by our senses. Father Malebranche agreed with Descartes, that the existence of a material world requires proof; but being dissatisfied with Descartes's argument from the perfection of the Deity, he thought that the only solid proof of it is derived from divine revelation. Mr. Norris, a great admirer of Descartes and of Malebranche, seems to have thought all the arguments offered by them and by Arnauld to be weak, and confesses that we have at best only probable evidence of the

the existence of the material world. Mr. Locke acknowledges, that the evidence we have of this point is neither intuitive nor demonstrative. At last bishop Berkeley and Collier undertook to prove, that there neither is nor can be a material world. Mr. Hume has adopted Berkeley's arguments against the existence of matter, and thinks them unanswerable. From the single principle of the existence of our own thoughts, very little, if any thing, as Dr. Reid conceives, can be deduced by just reasoning, especially if we suppose that all our other faculties may be fallacious. Accordingly we find that Mr. Hume was not the first that was led into scepticism by the want of first principles: for soon after Descartes, there arose in France a sect called *Egoists*; which see. Mr. Locke's sentiments on the subject of first principles and maxims are well known. He allows that part of our knowledge is intuitive (see KNOWLEDGE); and that this kind of knowledge is necessary to connect all the steps of a demonstration. He also maintains, that axioms, or intuitive truths, are not innate; and he observes, that self-evidence is not peculiar to those propositions, which pass under the name of axioms, and have the dignity of axioms ascribed to them; and that the particular propositions contained under a general axiom are no less self-evident than the general axiom; and that they are sooner known and understood. Nevertheless, this excellent writer is of opinion, that concerning the real existence of all other beings, besides ourselves and a first Cause, there are no maxims. Dr. Reid, on the other hand, contends, that there are maxims or first principles with regard to other existences. Mr. Locke further maintains, that no science is, or hath been, built upon maxims: whereas it cannot be disputed, that every demonstration in geometry is grounded either upon propositions formerly demonstrated, or upon self-evident principles. He also observes, that maxims are not of use to help men forward in the advancement of the sciences, or new discoveries of yet unknown truths: to which it may be replied, that Newton, as well as all other mathematicians, ground their demonstrations of mathematical propositions upon the axioms laid down by Euclid, or upon propositions which have been before demonstrated by help of those axioms. Our great astronomer, by laying down the first principles upon which he reasons, in those parts of natural philosophy which he cultivated, has given a stability to that science which it never had before, and which it will retain to the end of the world. On the subject of first principles, another writer, viz. Père Buffier, a French Jesuit, has written a treatise, entitled "Traité des premiers Veritez, et de la Source de nos Jugemens," and published in 8vo., in 1724; and afterwards in folio, as a part of his "Cours des Sciences," Paris, 1732. This ingenious writer defines first principles to be propositions so clear, that they can neither be proved nor combated by those that are more clear. The first source of first principles, which he mentions, is that intimate conviction which every man has of his own existence, and of what passes in his own mind. A second source of first principles he makes to be common sense; for an account of which, see COMMON SENSE. Father Buffier, says Dr. Reid, has the honour of being the first, as far as he knows, after Aristotle, who has given the world a just treatise upon first principles. Some late writers, particularly Dr. Oswald, Dr. Beattie, and Dr. Campbell, have been led into a way of thinking somewhat similar to that of Buffier; the two former, as Dr. Reid presumes, without any intercourse with one another, or any knowledge of what Buffier had written on the subject. See the article to which we have above referred; and Reid's Essays on the Intellectual Powers of Man, *ess. vi. chap. 7.*

Leibnitz maintained, that the principles of contradiction, and of a sufficient reason, were the foundations of all science; that the first was sufficient for the demonstration of all necessary, and the other of all contingent truths. But though it be true, that the principle of contradiction, that is, the *reductio ad absurdum*, often occurs expressly, and is oftener implied in geometry, yet by what has been said it appears, that this principle alone is not sufficient to demonstrate all the other universally received principles of that science. Far less is it true, that we are enabled by the principle of a sufficient reason, which amounts to the exclusion of pure chance out of the universe, to demonstrate all physics and morals; but additional principles, derived from experience, must be assumed.

PRINCIPLES of *Action* denote, according to the definition of Dr. Reid, every thing that incites us to act: and he distinguishes the actions of man into three general classes, viz. voluntary, involuntary, and mixed. See ACTION, in *Ethics*.

The investigation of these principles is attended with considerable difficulty, from various causes: *first*, on account of the great number of active principles that influence the actions of men; and, *secondly*, because the same action, and even the same course and train of action, may proceed from very different principles. Some admit no principle but self-love; others resolve all into the pleasures of sense, variously modified by the association of ideas; others admit disinterested benevolence with self-love; others reduce all to reason and passion; others to passion alone; nor is there less variety about the number and distribution of the passions. (See PASSION.) There are some principles of action, which require no attention, no deliberation, no will. These, for distinction's sake, Dr. Reid calls *mechanical*: another class he denominates *animal*, as they are common to man with other animals; and a third class he calls *rational*, being proper to man as a rational creature. The *mechanical* principles of action he reduces to two species, *instincts* and *habits*; see these articles. The *animal* principles of action are such as operate upon the will and intention, but do not suppose any exercise of judgment or reason; and are, most of them, to be found in some certain animals as well as in man. The first of these Dr. Reid calls *appetites*. (See APPETITE.) Another class comprehends those which he denominates *desires*; and he distinguishes them from appetites by this circumstance, that there is not an uneasy sensation proper to each, and always accompanying it; and that they are not periodical, but constant, not being sated with their objects for a time, as appetites are. The desires which he has chiefly in view are, the desire of power, the desire of esteem, and the desire of knowledge. (See DESIRE.) These principles, it is observed, have things, not persons, for their objects, and cannot, therefore, with propriety, be called either "selfish" or "social." But, besides these, there are various principles of action in man, which have persons for their immediate object, and imply, in their very nature, our being well or ill affected to some person, or, at least, to some animated being. Such principles Dr. Reid denominates *affections*, whether they dispose us to do good or hurt to others. (See AFFECTIONS of *Mind*, PASSION, and DISPOSITION.) Opinion also (see OPINION) has a considerable influence upon the animal principles of action, whilst it is an essential ingredient in those that are rational.

The *rational* principles of action in man have this name appropriated to them, because they can have no existence in beings not endowed with reason, and, in all their exertions, require, not only intention and will, but judgment and reason. The ends of human actions, considered in this connection, are two, viz. what is good for us upon the

the whole, and what appears to be our duty. The conception of what is good or ill for us upon the whole, is the offspring of reason, and can only exist in beings endued with reason: and if this conception give rise to any principle of action in man which he had not before, that principle may very properly be called a rational principle of action. As soon as we have a conception of what is good or ill for us upon the whole, we are led, by our constitution, to seek the good and avoid the ill; and this becomes not only a principle of action, but a leading or governing principle, to which all our animal principles ought to be subordinate. Accordingly, Dr. Price suggests, and Dr. Reid concurs with him in opinion, that, in intelligent beings, the desire of what is good, and aversion from what is ill, are necessarily connected with the intelligent nature; and that it is a contradiction to suppose such a being to have the notion of good without the desire of it, or the notion of ill without aversion from it. This rational principle of a regard to our good upon the whole, gives us the conception (we should rather say a stronger feeling) of a *right* and a *wrong* in human conduct; at least of a *wise* and a *foolish*. Thus it produces a kind of self-approbation, when the passions and appetites are kept in their due subjection to it, and a kind of remorse and compunction, when it yields to them. In these respects this principle is so similar to the moral principle, or conscience, and so interwoven with it, that both are commonly comprehended under the name of "reason;" and hence many of the ancient philosophers, and some among the moderns, have been led to resolve conscience, or a sense of duty, entirely into a regard to what is good for us upon the whole. The principle of a regard to our good upon the whole, does, agreeably to the opinion of the wisest men in all ages, in a man duly enlightened, lead to the practice of every virtue. Some philosophers have supposed that this principle is the only regulating principle of the human conduct; but in this view of its importance and use, it is essentially defective for the following reasons. The greater part of mankind can never attain to such extensive views of human life, and so correct a judgment of good or ill, as the right application of this principle requires. Besides, though a steady pursuit of our real good may, in an enlightened mind, produce a kind of virtue which is entitled to some degree of approbation, yet it can never produce the noblest kind of virtue, which claims our highest love and esteem. Disinterested goodness and rectitude constitute the glory of the Deity, without which he might be an object of fear or hope, but not of true devotion: and it is the image of this divine attribute in the human character, that is the glory of man. But to serve God, and be useful to mankind, without any concern about our own good and happiness, is, possibly, beyond the pitch of human nature; and yet to serve God, and be useful to man, merely to obtain good to ourselves, or to avoid ill, is servility, and not that liberal service which true devotion and real virtue require. Moreover, although one might be apt to think, that he has the best chance for happiness who has no other end of his deliberate actions but his own good; yet a little consideration may satisfy us of the contrary.

Upon the whole, we may observe, that although a regard to our good upon the whole be a rational principle in man, yet if it be supposed the only regulating principle of our conduct, it would be a more uncertain rule, it would give far less perfection to the human character, and far less happiness than when joined with another rational principle, *viz.* a regard to duty.

This leads us to observe, that the subject of law must have the conception of a general rule of conduct, which, without some degree of reason, he cannot have. He must like-

wife have a sufficient inducement to obey the law, even when his strongest animal desires draw him the contrary way. This inducement may be a sense of interest, or a sense of duty, or both concurring. These principles, being those alone which can reasonably induce a man to regulate all his actions according to a certain general rule or law, may be justly called the *rational* principles of action, since they can only exist in a being endued with reason, and since it is by them only, that man is capable either of political or of moral government. It is a consideration of great moment in our investigation of the rational principles of conduct now stated, how we learn to judge and determine, that this cause of action is right, and that another of an opposite kind is wrong. The abstract notion of moral good and evil would be of no use to direct our practice, if we had not the power of applying it to particular actions, and determining what is morally good, and what is morally evil. Some philosophers ascribe this to an original power or faculty in man, which they call "moral sense," the "moral faculty," or "conscience." (See *Moral SENSE* and *CONSCIENCE*.) Others think that our moral sentiments may be accounted for without supposing any original sense or faculty appropriated to that purpose, and in order to account for them, they adopt very different systems. Reid's *Essays on the Active Power of Man*, *Ess.* iii. See *APPROBATION*, *OBLIGATION*, *VIRTUE*, and *Moral PHILOSOPHY*.

PRINCIPLES, Innate. See *INNATE*.

PRINCIPLE, in *Physics*, or *Principle of a natural body*, is something that contributes to the essence of a body; or, of which a natural body is primarily constituted.

Aristotle defines principles to be those things which are not made and constituted of themselves, nor of other things, but all things of them: *quæ non fiunt ex se invicem, nec ex aliis, sed ex iis omnia*.

To give an idea of natural principles, consider a body in several states: a coal, *e. gr.* that was just now a piece of wood: it is evident there is something in the coal, which before existed in the wood; this, whatever it is, is a principle, and is what we call matter.

Again, there must be something joined with this matter, to make it wood rather than fire, or fire rather than wood: this is another principle, and is what we denominate form.

Matter and form, then, are universal principles of natural bodies; by the union of these they are produced or generated. The Peripatetics add a third principle; *viz. privation*; for though, say they, a thing is not made from nothing, yet it must be made from its not being that thing before. This Aristotle calls *privation*, and admits it as a third principle; or a principle of corruption. But the moderns reject it: for if privation be a principle, it is at least so in a very different sense from matter and form.

Some late philosophers admit no principles but *acid* and *alkali*. Aristotle distinguishes two sorts of natural principles, as they concur in the generation, or in the composition of bodies.

PRINCIPLES of Generation, or of a body *in fieri*, are those without which a natural generation can neither be, nor be conceived. Such are the three principles above mentioned, *matter*, *form*, and *privation*.

As to matter, or the first matter, as it is called, it is neither substance nor accident; it has no quality or property; it is nothing actually, but every thing potentially. It has so strong an appetite for form, that it is no sooner divested of one form, than it is clothed with another, and is equally susceptible of all forms successively. Form, or as it is also called, act or perfection, does not consist in the figure, size, arrangement, or motion of the parts of matter: these, in-

deed, are accidental forms, by which artificial things are formed; but every production of nature has a substantial form, which, joined to matter, makes it to be what it is. The substantial form is a kind of informing soul, which gives the thing its specific nature, and all its qualities, powers, and activity. See MATTER and FORM.

PRINCIPLES of Composition, or of a body *in facto esse*, already made, or those of which natural bodies really consist. Such, according to him, are *matter* and *form*; to which some add a third, *viz.* union to connect the two others together. But this is only necessary upon supposition of substantial forms.

Principles are usually confounded with elements; yet there is a real difference: elements are properly the first and simplest beings, arising from the first determination or assemblage of principles. They are the simplest things in which matter and form are combined. Elements and principles, therefore, differ in this, that a principle, as matter, is only a begun, not a complete nature; but an element is perfect and complete.

Some ancient philosophers distinguished between principles, *αρχαι*, and elements *στοιχεια*.

Principles, according to them, were neither composed nor produced; but the elements were complex or compounded beings. Plutarch, ap. Eller. in Mem. de l'Acad. Berlin, 1746.

It would be endless to enumerate all the opinions of philosophers concerning the elements of bodies. A late author has given us a summary of many of these opinions; and, lastly, adds his own, that fire and water are the only things which properly deserve the name of elements, or principles of natural bodies; fire being the active, and water the passive principle. According to him, water is convertible into air, and into earth, by means of fire. Hence the four, vulgarly called, elements, may be reduced to two. He endeavours to establish his doctrine on the experiments of Boyle, Hales, and Muschenbroeck. See ELEMENTS.

To this head may likewise be referred what we call *mechanical principles of bodies*, which serve to account for the mechanism or artificial structure of things, and all the varieties and differences of bodies from motion, figure, and other common affections.

These principles are differently maintained by three or four different sects of philosophers; *viz.* the ancient Epicureans, or Corpuscularians, to whom may be added the modern Gassendists, the Cartesians, and the Newtonians.

PRINCIPLES, in *Chemistry*, are the first and simplest parts of which natural bodies are compounded, and into which they are again resolvable by fire, &c.

These are more properly, as well as more commonly, called *elements*.

In each school of philosophy among the ancients, very different opinions prevailed concerning these principles; some of them admitting only one, and others more. Some contending for earth, and others for fire. Nor were the notions of the chemists of the middle ages, or about the time of Paracelsus, more clear and satisfactory. They admitted five principles of bodies, which they call mercury or spirit, phlegm or water, sulphur or oil, salt, and earth. But it has been found by later experiments, that some of these principles are more simple than others; and, therefore, Beccher attempted to reduce their number, and established only two general principles of all bodies, *viz.* water and earth; extending the term to that which is vitrifiable, and which he conceived to be the principle of the fixity, solidity, and hardness of bodies; to that which is inflammable, and

to which he ascribed the inflammability of all inflammable bodies; and to that which he called *mercurial earth*.

This theory has been farther illustrated and extended by Stahl, who shewed, that water and vitrifiable earth enter as elements into the composition of many bodies; but the other two principles of Beccher, *viz.* the mercurial earth and the inflammable earth, have not yet been exposed to our senses single and pure: though some have supposed that the existence of the latter is sufficiently ascertained (see PHLOGISTON), but that of the latter is not satisfactorily demonstrated.

That earth, water, and fire, enter into the composition of bodies as principles, has been considered as demonstrated by Beccher and Stahl: and the experiments of Boyle, Hales, Priestley, &c. sufficiently prove that air enters into the composition of many bodies as a principle. So that the chemists generally admit the four principles of Aristotle, *viz.* fire, air, water, and earth. In whatever manner bodies are decomposed, we always obtain these substances; and they are the utmost limits of chemical analysis. These are, therefore, called *primary principles*, or *elements*.

Secondary principles are those which result immediately from the union of primary principles.

Principles of the third order are those which are composed of secondary principles, &c. Thus, nitre is a compound of the acid called nitrous, and of the fixed vegetable alkali, combined and saturated together: by a first analysis of nitre, we obtain this acid and this alkali, which are, therefore, the proximate principles of nitre. But neither of these are simple substances. By a farther analysis of each of these, they may be decomposed into water, earth, and fire, or the inflammable principle: and these may be considered as primary principles; but the acid and alkali are secondary principles. The water, earth, and fire are the remote principles of the nitre. Dict. Chem. Eng. edit. art. *Principles*. See also Geoffroy's Tracts, p. 5, &c.

PRINCIPLE, *Inflammable*. See PHLOGISTON.

PRINCIPLE, *Original, principium originale*, a name given by Tachenius, and some other authors, to salt, without considering it as acid, alkali, or of any other particular kind; or any mode of existence. But many others allow this name only to water, or at least that water is, in almost all natural bodies, the most copious, the most active, and the most influencing part; yet even this is found to agree much better with some bodies than with others.

PRINCIPLES, among *Hermetic Philosophers*. According to these gentlemen, the two *universal* principles of sensible nature, are subtle and solid; which, being joined in a greater or less degree, generate all that beautiful variety of beings in the universe.

The three *natural* principles are salt, sulphur, and mercury. These principles generate the four elements; and are, as it were, secondary elements, inasmuch as they are contained in all mixed bodies. Sulphur is the first, and stands in the place of male; mercury the second, standing in the place of female; and salt the third, which copulates the others together. Dict. Hermet.

PRINCIPLE is also applied to the foundations of arts and sciences. In this sense we say, principles are not to be proved; they must be common notions.

There is no disputing against a man that denies principles: the worst reasoning is that which includes a *petitio principii*; *i. e.* which supposes a principle that ought to be proved.

PRINCIPLE is also applied by extension to the first rules or maxims of an art.

In this sense we say a man is ignorant of the principles of

of geometry ; meaning he has not learnt Euclid's Elements. The principles of most arts and sciences are found in this Dictionary under their respective heads.

PRING, in *Geography*, a town on the W. coast of Sumatra. S. lat. $4^{\circ} 12'$. E. long. $102^{\circ} 28'$.

PRINGLE, Sir JOHN, in *Biography*, a distinguished physician, was born at Stichel-house, in the county of Roxburgh, in April 1707. He was the youngest son of sir John Pringle, bart. of Stichel, and of Magdalen Elliot, sister of sir Gilbert Elliot, two families of ancient and honourable repute in the south of Scotland, and distinguished for their public and private virtues. He received his grammatical education at home, under a private tutor, and afterwards went to St. Andrew's, where a near relative of his father's, Mr. Francis Pringle, was professor of Greek. Having determined to make medicine his profession, he went to Edinburgh, in October 1727, which, however, he quitted, after a residence of one year, with the view of profiting from the instructions of the celebrated Boerhaave, who was then advanced in years. While he studied at Leyden, he contracted an intimate friendship with Van Swieten, who subsequently obtained the highest reputation at Vienna and throughout Europe. He graduated at that university in July 1730, publishing an inaugural dissertation, "de Marcore Senili," and then repaired to Edinburgh, where he settled as a physician, and gained the esteem of the magistrates and professors by his abilities and good conduct. His knowledge of ethics obtained for him, in March 1734, the appointment of joint professor of moral philosophy with Mr. Scott, and sole professor after the death of the latter ; and he continued in the discharge of the duties of this office, and in the practice of physic in Edinburgh, until 1742, when he was appointed physician to the earl of Stair, who then commanded the British army ; and in August, in the same year, he was nominated physician to the military hospital in Flanders. He did not, however, resign his professorship on this occasion, as the university permitted him to appoint a substitute in his absence as long as he requested it.

From this time Dr. Pringle's career began to open in a new and successful walk ; his reputation as an army-physician not only obtained for him a high professional rank, but also the patronage of the great. On the retirement of his noble friend, the earl of Stair, after the battle of Dettingen, he offered to resign with him, but was not permitted. He attended the army in Flanders through the campaign of 1744, and so strongly recommended himself to the duke of Cumberland, by the able and assiduous discharge of his duties, that in the spring following, he received a commission from his royal highness, appointing him physician-general to his majesty's forces in the Low Countries ; and on the next day a second, constituting him physician to the royal hospitals in the same countries. In consequence of these promotions, he immediately resigned his professorship. In 1745 he was with the army in Flanders, but was recalled to attend the forces about to be sent against the rebels in Scotland. In the beginning of 1746 he accompanied the duke of Cumberland in this expedition, and remained with the forces after the battle of Culloden, till their return to England in August. In 1747 and 1748, he again attended the army abroad, and in the autumn of the latter year, on the conclusion of the treaty of Aix-la-Chapelle, he embarked with the forces for England. In 1749 he was appointed physician to his royal highness the duke of Cumberland, and took up his residence in London, where the high reputation and distinguished connections

which he had acquired, afforded every reasonable expectation of success as a physician. He attended the camps in England, however, during three seasons, in the war which commenced in 1755, and finally quitted the service of the army in 1758.

Dr. Pringle had been elected a fellow of the Royal Society in 1745, and on settling in London, he became a very active contributor to its Transactions. His first publication was a letter to Dr. Mead, entitled "Observations on the Gaol or Hospital Fever," 1750, which appears to have been brought forward in consequence of the alarm excited by the fever which appeared at the Old Bailey. This little work passed through two editions, and was afterwards inserted in his great work on the diseases of the army, of which it constitutes the seventh chapter of the third part. In the same year he began to communicate to the Royal Society his "Experiments on Septic and Antiseptic Substances," in a series of papers, which were afterwards subjoined, by way of appendix, to the work just mentioned, and which procured him the Copleian medal. For several successive years, he added many papers to the Transactions, especially an account of the contagious fever at Newgate, a case of fragility of the bone, an account of several earthquakes, and of a fiery meteor, &c.

In the year 1752, the first edition of his "Observations on the Diseases of the Army" was given to the public, and it was reprinted in the following year. The third edition was considerably improved by the further experience, which his attendance on the English camps for three years enabled him to obtain ; and many subsequent editions have been called for, as well as translations into the French, German, and Italian languages. This work, indeed, the result of acute and diligent observation and extensive experience, was calculated to become a standard of reference, not only to the medical officers, but to the leaders of armies, to whom the preservation of the health of their troops is of the utmost importance ; it necessarily procured extensive fame for its author, whom it placed high among the benefactors to medical science, and to mankind ; and it remains at present a classical work. It contributed materially, indeed, to the introduction of those principles, by which the salubrity of crowded population has been subsequently augmented, and the sources of many malignant diseases have been nearly destroyed, under the farther directions of a Howard, a Lind, and a Haygarth, and which were so signally illustrated by the example of captain Cook. In a word, its utility was equal to its reputation.

It was not until he had quitted the army in 1758, that Dr. Pringle was admitted a licentiate of the College of Physicians, probably from the uncertainty of his residence. Soon afterwards, however, his medical character, as well as his reputation as a philosopher, attained a high pitch, and both honours and emoluments flowed in upon him. After the accession of George III., he was appointed physician to the queen's household in 1761, and physician extraordinary to her majesty in 1763 ; and in the same year he was elected a fellow of the College of Physicians. In 1764, on the death of Dr. Wollaston, he was made physician in ordinary to the queen, and two years afterwards was raised to the dignity of a baronet. In 1768 he was nominated physician to her royal highness the princess dowager of Wales ; and in 1774 he received the appointment of physician extraordinary to the king.

Among the numerous literary honours which sir John Pringle received from the various academies of science in Europe, the highest was conferred upon him in the year

1770, when, on the decease of James West, esquire, he was elected president of the Royal Society. Though now in the sixty-sixth year of his age, he spared no exertion to fulfil the duties of his new office, and endeavoured to cherish, by all the means in his power, the scientific ardour which was then rising in Europe, and especially in this country. It had been customary, since the time of Mr. Martin Folkes, for the president to make a speech on the annual delivery of sir Godfrey Copley's medal, which was usually short, and inserted in the minute-book. But the first speech which sir John Pringle delivered, after being called to the chair, being more elaborate and extended, the publication of it was requested; and for the five subsequent years he continued the practice of giving a learned discourse on these occasions, entering at large into the previous history of that part of science, to which the paper (which was complimented by the award of the medal) related. In these six discourses, which treated of the subjects of fictitious gases, of the torpedo, of the attraction of mountains, of captain Cook's mode of preserving the health of his crew, of the structure and composition of the specula of telescopes, and of the explosive powers of gunpowder, sir John displayed an extent and variety of knowledge highly creditable to his reputation; for they abound not only with proofs of his information on the subjects of medicine, natural history, and philosophy, but with a fund of ancient and modern learning. Had he continued to preside in the chair of the Royal Society, he would no doubt have found other occasions of displaying his acquaintance with the history of science. But finding his health declining with his years, he resigned his office in 1778, in opposition to the solicitations of many distinguished members of the society, and was succeeded by the present distinguished president, sir Joseph, then Mr. Banks. Still, however, he maintained his zeal for science and his country; for few learned foreigners visited this country without paying him their respects.

Finding his health declining, sir John Pringle took a journey to Scotland in 1780, and spent the summer there, principally in Edinburgh. Here he met with so kind a reception, that he purchased a house, with the intention of returning in the following spring; and having disposed of the greater part of his library, and of his house in Pall-Mall, on his return to London, he put this intention in execution in April 1781. But he was disappointed in his expectations of health and satisfaction from this change. Edinburgh was not now to him what it had been in early life: it was too late to form new habits of friendship; and the few old friends who remained, were not able to meet with the same ardour as formerly. The air, also, he found too sharp for his weakened frame. He determined, therefore, once more to return to London, where he arrived in the beginning of September. Before he quitted Edinburgh, he presented to the college of physicians of that city ten volumes, folio, in manuscript, of "Medical and Physical Observations," with the restriction that they should not be published, and never lent out of the library on any pretence whatever.

On his arrival in London, sir John found his spirits somewhat revived by the society of his friends. His Sunday evening conversations were again honoured with the attendance of many respectable men; and he enjoyed the pleasure of spending a couple of hours, on the other nights of the week, with his friends, at a society, which had been long established, and had met for some time past at Mr. Watson's, a grocer in the Strand. His constant attendance

upon this society constituted, to the last, his principal amusement. During this winter, however, his strength declined rapidly; and on Monday evening, January 14, 1782, he was seized with a fit, while with the society at Watson's, which terminated his life on the Friday following, at the age of 75. The account of his death was every where received in a manner which evinced the high sense that was entertained of his merit.

Sir John Pringle left no family. He married, in 1752, the daughter of Dr. Oliver, an eminent physician at Bath, who died a short time afterwards. He had acquired by his long practice a handsome fortune, which he disposed of with great prudence and propriety. His mind was characterised by a great love of science, founded on the basis of fact and experiment, and by an aversion to hypothetical speculation. He had not much taste for poetry, and had little relish even for our immortal Shakspeare; but to the sister art, music, he had a strong attachment, and was even a performer on the violoncello, at a weekly concert, given by a society of gentlemen at Edinburgh. He paid great attention to the French language, and studied his own with great assiduity. He took uncommon pains, indeed, to perfect the style of his own compositions; and it cannot be denied that he excels in perspicuity, correctness, and propriety of expression. His leading principle of action through life was a rigid integrity, according to the unanimous testimony of all his acquaintance; and he was equally distinguished for his sobriety, having never, as he informed Mr. Boswell, been intoxicated in his life. He was ardent and steady in his friendships, and was active in his civilities and good offices to all strangers and foreigners, who came to him well recommended; but he had at times a dryness and reserve in his behaviour, which had the appearance of coldness, especially when he was not perfectly pleased with the persons who were introduced to him. He was, in fact, above assuming the professions, without the reality of respect. His sense of integrity and dignity would not permit him to adopt that false and superficial politeness, which treats all men alike, however different in point of real estimation and merit. His connections and acquaintance were exceedingly numerous, including men of all professions, as well as many persons of rank and consequence; and he corresponded with many eminent philosophers and physicians, whom he had never seen. He was interred in St. James's church, and a monument was erected to his memory, by his nephew and heir, sir James Pringle, in Westminster Abbey. See Dr. Kippis's *Life of Pringle*, prefixed to the six Discourses.

PRINKIPOS, in *Geography*, the most considerable and the most fertile of those denominated "Prince's" islands, in the sea of Marmora. It appears, says Olivier, to be entirely volcanic, and formed of quartz, granites, &c. &c. altered or decomposed. The land is elevated, uneven, and hilly. It is dry and arid on the hills, red and tolerably fertile in the bottoms, and especially to the south of the town. The natural productions are the Aleppo pine, the oxycedrus or brown-berried juniper, the broad-leaved phillyrea, the arbutus, the prickly pimpinella, the pale-flowered French lavender, the broom, the acute-leaved asparagus, the Cretan cistus or rock-rose, the turpentine tree, a species of favory, the mallow-leaved bindweed, &c. &c. The wild olive-tree is found in abundance on all the hills. The culture of Prinkipos consists in a few fields sown with wheat, barley, chick-peas, kidney-beans, broad beans, &c. The vine is not abundant; it yields two or three sorts of very good grapes, from which wine is seldom made. The inhabitants prefer carrying the grapes to the markets of Constantinople, and there

there selling them. Near the town are several gardens, in which are cultivated, with no great skill, a few kitchen-garden plants and fruit-trees, among which is distinguished a species of fig-tree, with fruit greenish without and red within, and of an excellent quality.

This island has several times served as a prison or place of exile to the Greek princes. Irene, an Athenian woman, who had been raised to the throne from an obscure station by the charms of her mind and the graces of her person, and who, setting no bounds to her ambition, stained herself by various crimes after the death of Leon Porphyrogenitus, her husband, was dethroned by Nicephorus, one of her confidants, and banished to a monastery of this island, which she herself had caused to be erected. In this island, quails that are fat, and well tasted, are abundant; besides some other birds of passage, such as turtles, rollers, loriots, thrushes, &c. and in particular falcons and sparrow-hawks. Hares are scarce in this island, and it has no rabbits. Oysters, muscles, and several fishes, such as mackarel, bonito, turbot, and the bearded mullet, are plentiful. There are two monasteries in Prinkipos, situated on the most elevated and solitary places of the island. N. lat. $40^{\circ} 51'$. E. long. $28^{\circ} 56'$.

PRINOS, in *Botany*, an ancient generic name used by Theophrastus and Dioscorides; probably derived from $\pi\rho\iota\nu\alpha$, *to saw*, and applied by Linnæus to this genus on account of the strong serratures of the leaves in some of the species.—Linn. Gen. 174. Schreb. 231. Willd. Sp. Pl. v. 2. 225. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 2. 312. Pursh. 213. Michaux Boreal-Amer. v. 2. 236. Juss. 379. Lamarck Illustr. t. 255. Class and order, *Hexandria Monogynia*. Nat. Ord. *Dumosa*, Linn. *Rhamni*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, six-cleft half way down, flat, very small, permanent. *Cor.* of one petal, wheel-shaped; tube none; limb flat, deeply cloven into six ovate segments. *Stam.* Filaments six, awl-shaped, erect, shorter than the corolla; anthers oblong, obtuse. *Pist.* Germen superior, ovate, terminating in a style shorter than the stamens; stigma obtuse. *Peric.* a roundish berry, six-celled, much larger than the calyx. *Seeds* solitary, bony, obtuse, convex on one side, angular on the other.

Obs. The chief difference between this and *Ilex* consists in its being hexandrous; but the parts of fructification, according to Jussieu, agree occasionally with that genus in number. *Prinos* is sometimes dioecious.

Eff. Ch. Calyx inferior, six-cleft. Corolla of one petal, wheel-shaped, from three to seven-cleft. Berry of six seeds.

1. *P. verticillatus*. Deciduous Winter-berry, or Service-Bush. Linn. Sp. Pl. 471. Smith Insects of Georgia, t. 86. (*P. Gronovii*; Michaux Boreal-Amer. v. 2. 236. *Aquifolium foliis deciduis*; Duham. Arb. v. 1. 62. t. 23.)—Leaves obovate-lanceolate, pointed, doubly serrated, with downy veins underneath.—Found in moist woods, or on the banks of ditches all the way from Canada to Virginia. It flowers in June and July. *Stem* shrubby, eight or ten feet high, branched all the way up. *Leaves* alternate, on short stalks, about three inches long, and one broad, acutely pointed, paler beneath. *Flowers* solitary, or two or three together at the base of the leaf-stalks, small, white. *Berries* red or crimson, at length purple, larger than those of the Holly.

Mr. Abbot mentions that the fruit of this shrub is said to have been useful in curing the diarrhœa. Duroi says that *P. verticillatus* has sometimes a seven and even eight-cleft corolla, with a like number of stamens.

2. *P. montanus*. Mountain Winter-berry. Willd. n. 2.

Swartz. Prodr. 58. Ind. Occ. v. 1. 622.—Leaves ovate, serrated, shining on both sides.—Native of Jamaica, in thickets on the loftiest mountains, flowering in August, and bearing fruit in December. The *trunk* of this tree is upwards of twenty feet high, with a smooth, brown bark. *Branches* much divided, nearly upright, round, smooth. *Leaves* alternate, on short stalks, pointed at both ends, when dry of a dark, livid colour. *Flowers* two or three together, on separate stalks, small, white. *Berries* blackish.

3. *P. dioicus*. Dioecious Winter-berry. Willd. n. 3. Vahl. Eclog. v. 2. 25. t. 14.—Leaves oblong-ovate, somewhat serrated, smooth, coriaceous. Flower-stalks axillary, generally single-flowered. Flowers dioecious, tetrandrous.—Found by Mr. Ryan, in the island of Montserrat. *Stem* branched. *Branches* half an inch thick, with a grey, dotted bark, the younger ones alternate, dusky purple. *Leaves* alternate, slightly serrated, entire at the base, smooth on both sides, paler and slightly dotted beneath. *Flowers* generally three together in the males, always solitary in the females.

4. *P. nitidus*. Shining Winter-berry. Willd. n. 4. Vahl. Eclog. v. 2. 26.—Leaves oblong-ovate, serrated, shining, membranaceous. Flower-stalks axillary, each with a single, tetrandrous flower.—Native of Montserrat; found there by Mr. Ryan. *Branches* angular, smooth, compressed, dusky purple. *Leaves* alternate, on short stalks, very shining, commonly contracted towards the base. *Flowers* solitary, rather large. *Berry* ovate, or roundish, the size of black pepper.

5. *P. glaber*. Smooth or Evergreen Winter-berry, or Gall-berry. Linn. Sp. Pl. 471. Sm. Insects of Georgia, t. 35.—Leaves lanceolate, rather obtuse, smooth, serrated at the top.—Native of Canada in sandy shady woods, introduced at Kew in 1759, where it flowers in July and August. The *stems* of this plant are much branched. *Branches* alternate, smooth, brown, the younger ones green. *Leaves* alternate, stalked, lightish green, with a yellow rib, pale and downy beneath, evergreen, resembling those of Sweet Gall. *Flowers* small, on axillary stalks, generally three together. *Berries* round, purplish or black, solitary, on long stalks, called in Jersey Ink-berries. Obs. The synonyms from Miller and Catesby, quoted by Linnæus for this species, belong to *Ilex vomitoria*.

6. *P. sideroxyloides*. Round-leaved Winter-berry. Willd. n. 7. Swartz. Prodr. 58. Ind. Occ. v. 1. 624.—Leaves roundish, quite entire.—Native of the Caribbee Islands, St. Christopher's and Montserrat. The *wood* of this tree is durable. *Branches* divided, round, ash-coloured. *Leaves* alternate, stalked, smooth on both sides, paler beneath, coriaceous. *Flowers* on single, axillary stalks, small, whitish. *Berry* roundish, crowned with the stigma pressed close.

Mr. Pursh, in his North American Flora, tells us it is plain from specimens in the herbarium of A. B. Lambert, esq. V.P.L.S., that *Prinos lucidus*, Willd. n. 6. Ait. Hort. Kew. n. 3, is *Ilex canadensis* of Michaux Boreal-Amer. v. 2. 229. t. 49.

7. *P. ambiguus*. Doubtful Winter-berry. Michaux Boreal-Amer. v. 2. 236. Pursh v. 1. 220. (*Cassine caroliniana*; Walt. Carolin. 242.)—Leaves oval, pointed at both ends, serrated, deciduous.—Found in sandy wet woods, on the borders of swamps from New Jersey to Carolina, flowering in July and August. This is a dioecious species, whose male flowers are crowded together in clusters at the bottom of the smaller branches; female ones solitary: they

they are pentandrous and white. *Berries* larger than in *P. verticillatus*.

The three following new species are adopted from Pursh's *Flora*, v. 1. 220, 221.

“*P. laevigatus*. Leaves deciduous, lanceolate, closely serrated, pointed at each end; smooth and shining above; slightly downy at the nerves beneath. Flowers six-cleft; males scattered; females axillary, solitary, nearly sessile.—On the Alleghany mountains: from New York to Virginia; flowering in July. *Berries* large, dark red.

“*P. lanceolatus*. Leaves deciduous, lanceolate, very delicately and remotely serrated, acute at each end, smooth on both sides. Male flowers aggregate, triandrous; females scattered, two together, stalked, six-cleft. In the lower tracts of Carolina and Georgia, flowering in June. *Berries* small, scarlet.

“*P. coriaceus*. Leaves evergreen, wedge-shaped, lanceolate, coriaceous, smooth, shining, entire. Corymbs axillary, very short, sessile, many-flowered. Flowers six-cleft.—In sandy woods, near the banks of rivers in Georgia, flowering in June and July. A handsome tall shrub, of the appearance of *Ilex Dahoon*.

Mr. Pursh mentions two varieties of this species, the first of which with “Leaves obovato-lanceolate, pointed,” he calls *latifolia*; the second with “Leaves lanceolate, acute,” he calls *angustifolia*.

PRINOS, in *Gardening*, contains plants of the deciduous and evergreen kind, of which the species cultivated are, the deciduous winter berry (*P. verticillata*); and the evergreen winter berry (*P. glabra*).

Method of Culture.—In these plants it is effected by seeds, sown soon after they are ripe, or early in the spring, upon a bed of light earth, covering them half an inch with the same sort of earth; but the seeds which are put into the ground in the autumn will many of them come up the following spring, while those which are kept longer out of the ground, often remain a whole year before the plants appear, as in holly, hawthorn, and some others. The seeds may be forwarded in their growth by means of a hot-bed. When the plants have sufficient strength they should be planted out, some in nursery-rows and others in pots. They delight in a moist soil and shady situation. In hot land they make little progress, and rarely produce fruit.

They are ornamental, and afford variety in the pleasure-grounds, and among potted plants.

PRINTER, TYPOGRAPHUS, a person who composes, and takes impressions, from moveable characters, ranged in order, or from plates engraven, by means of ink and a press.

Laurentius, called Coster, Geinsfleisch, Faust, Guttenberg, Schoeffer, Mentel, and Eggelstein, were the first printers. The first that practised it in England was Fred. Corfellis, brought over from Haerlem, under king Hen. VI.; in France, Uldric Gering, Martin Crantz, and Michael Friburgher; at Augsburg, John Bemler; at Rome, Conrad Sweynheim, and Arnold Pannartz, Germans; at Venice, the two brothers John and Vindelin of Spire, Nicholas Jenfon, and John de Cologn; at Florence, Bernard Cennini; at Naples, Sixtus Rufinger.

The great printers were Aldus of Venice, and his son, Paulus Manutius; the two Badii; William and Frederic Morel; Oporin; Frobenius; Rob. Hen. and Charles Stephens; Gryphius, Turnebus, Torres, Commelin, Plantin, Raphelengius, Vascosan, Beau, Crispin, and the two Elzevirs.

The learned printers were the Manutii, Amerbach, and Froben, of Basil, the Stephenses, the Badii, Turnebus, Wechel, Morel, Junta, &c.

Plantin had the title of *arch-printer*, *architypographus*, given him by the king of Spain, in consideration of his printing the Polyglot of Antwerp.

The names, characters, and eulogies of all the famous printers are found in part ii. of the first tome of the “*Jugemens de Scavans*.”

The printers, since the establishment of that art, are esteemed a part of the company of stationers and booksellers; before that establishment, the company consisted only of booksellers, binders, writers, illuminers, and parchment-makers. The parchment-makers prepared the skins, and made the parchment or vellum; which were then almost the only matters on which books were written. The writers, or copyists, wrote and transcribed books after copies given them by the booksellers. The binders were charged with the binding of those days, which was very coarse, only consisting of two slight boards covered with some paltry leather. The illuminers painted in miniature, and gilt initial letters, head-pieces, tail-pieces, and other compartments. Lastly, the stationers, or booksellers, set the writers to work, and sold their copies in shops, and other places, on the days allowed them by the statutes to expose the same.

PRINTING, TYPOGRAPHIA, the art of taking impressions with ink, from characters and figures, moveable or immovable, upon paper, vellum, or the like matter.

There are two kinds of printing; the one for books, the other from copper-plates, for pictures. The first called *common press printing*, the second *rolling press printing*.

The prime difference between the two consists in this, that the characters of the former are cast in relief, and those of the latter are engraven in creux.

The art of printing is a modern invention: it is, indeed, of a very ancient standing among the Chinese; but then their printing is very different from our's. It must be owned, the European printing, in its original, was much the same with the Chinese; yet, as there was at that time no commerce or correspondence between Europe and China, the passage into the East by the Cape of Good Hope being as yet undiscovered by the Portuguese, there is no room to charge the Europeans with borrowing their art from the Chinese: but each must be owned to have fallen on the same thing, though at very different times. Father Couplet assures us, that printing has been in use in China from the year 930. Father le Compte speaks more largely; saying, that it has been there from almost all ages: he adds, that there is this difference between their's and our's, that whereas we have but a very small number of letters in our alphabets, and by the various arrangement of these, are able to form infinite volumes; we have the advantage, by making our characters moveable, to print the largest works with an inconsiderable quantity of letter; those that served for the first sheets, serving over again for the succeeding ones: the Chinese, on the contrary, by reason of the prodigious number of their letters, are precluded this resource; and find it more easy and less expensive to cut all their letters on wooden blocks; and thus to make as many blocks as there are pages in a book; and these of no farther use but for that single work. Their method of printing see hereafter.

PRINTING, *Origin of*.—Who the first inventors of the *European* printing were, in what city, and what year, it was at first set on foot, is a famous problem long disputed among the learned. In effect, as the Grecian cities contended for the birth of Homer, so do the German cities for that of printing.

Mentz, Haerlem, and Strasburgh, are the warmest on this point of honour: Italy also would have entered the lists;

lifts; but the suffrages being at first divided between the first three pretenders, they are left in possession of the question, which, in reality, is not yet justly decided; though it must be owned, Mentz has always had the majority of voices.

We shall not here enter into a nice disquisition of the merits of the cause, but only propose the pretensions of each. John Mentel of Strasburgh, John Guttenberg and John Faust of Mentz, and L. John Colter of Haerlem, are the persons to whom this honour is severally ascribed by their respective countrymen; and they have all their advocates among the learned. Mentel, a physician of Paris, enters the lists in behalf of his namesake of Strasburgh; and contends that it was he who first invented printing in the year 1440, and that, in consideration of it, the emperor Frederic III. gave him a coat of arms corresponding to it, in the year 1466. He adds, that Guttenberg, whom he had taken in as a partner, or associate, carried it to Mentz, where he took in Faust a partner. John Gensfleisch, a native of Mentz, who was his servant, communicated the art to J. Guttenberg, whom Mentel had employed in making some of his tools; and becoming thus possessed of the art, they removed and settled at Mentz, where it was perfected by the assistance of John Faust. But this account depends on a Strasburgh chronicle of very doubtful authority, and is contradicted by the chronicle of Cologne, Trithemius, and Wimpeling. The last-mentioned writer expressly says, that the art of printing was invented, incompletely, at Strasburgh, by Guttenberg, and perfected at Mentz. Here Mentel acquired it from Guttenberg and Faust, and returning to Strasburgh about the year 1455, practised it in connection with Eggelstein.

The Haerlemers, with Boxhornius, Scriverius, &c. refer the first invention to Laurens Janz Colter, or Laurence John Colter, (called Colter on account of the public office distinguished by this appellation, which he sustained at Haerlem, and which was hereditary in his family,) of Haerlem, in the year 1430, adding, that his associate Guttenberg stole away his tools while he was at church, and carried them to Mentz, where he set up for the first inventor; though others attribute this theft, &c. to his partner Faust. And others, again, with greater probability, ascribe it to John Gensfleisch senior, one of his servants, in the year 1441: and with these types, &c. of Laurence, two small works were printed at Mentz in 1442. The principal evidence in favour of Haerlem, is Cornelius, who had been a servant of Laurence, and afterwards a book-binder in that city, on whose authority Adrian Junius, M. D. founds his account, which appears to have been drawn up between the years 1562 and 1575, and published at Leyden in 1588. The learned Meerman, in his "Origines Typographicæ," 1765, has amply vindicated and confirmed the account which Junius gives of the fact; though he disputes and sufficiently invalidates what this writer says, as to the types which were used by Colter, at Haerlem. These, he shews, were neither cut nor fusible metal types, but separate wooden types.

Munster, Polydore Virgil, Pasquier, &c. will have Guttenberg, or Guttemburg, to have really been the inventor of printing: and add, that he took in Faust and Schoeffer for associates.

Naude, in his "Mascurat," espouses the cause of Faust, or Faustus; and will have him to be the first printer in Europe, and that he took in Guttenberg for a partner. His reason for putting Faust in possession of this privilege is, that the first books that were printed appear to have

been all of his impression. To this purpose it is alleged, that it is more than probable, if Guttenberg or Colter had had a greater or an equal share in the invention, they would not have allowed him to attribute the whole to himself and his son-in-law Schoeffer, as he has done, without ever offering to do the like, or in the least contradicting him, and asserting their own right.

The true state of the case seems to be this, that metal types were first invented at Mentz; of these there were two sorts, viz. those that were cut, and those that were cast in matrices. The invention of the former has been ascribed by some writers to Faust, but without sufficient authority; the real inventor being John Gensfleisch senior, who had brought the art of printing with wooden types from Haerlem to Mentz, with whom John Gensfleisch junior, called Guttenberg, might probably have concurred. The era of this invention must be about the year 1442 or 1443; for John Gensfleisch senior came to Mentz in 1441, and the Latin bible, with metal types, was printed in 1450, which could not require less than seven or eight years.

The latter were invented by Peter Schoeffer, the servant and son-in-law of Faust, who settled at Mentz in the year 1449 or 1450, and having acquired under the two Gensfleischs the art of cutting types, remedied the inconvenience of this method by contriving to cast them, which must have been practised before the year 1459. The partnership that subsisted between Gensfleisch and Faust, and the relation between Schoeffer and Faust, have probably given occasion for ascribing to him the merit of the invention of printing with metal types, in which, from the connections of this kind, he probably might have had some concern.

The editions above referred to in Naude's account are,
 1. The "Codex Psalmodum," printed in 1457, which is the most ancient book known to be printed with a date or inscription, and is lodged in the emperor's library at Vienna.
 2. The "Rationale Divinorum Officiorum" of William Durand, printed at Mentz in 1459, in folio. This "Rationale" is in the earl of Pembroke's library. Malinkrot has erroneously supposed this to be the first printed book.
 3. The "Catholicon Januensis," dated in 1460, and now in the king's library. Faust's name, indeed, is not to this; but it is perfectly like the following ones where it is. It is said that the first printers did not subjoin their names and inscriptions at the end of their books till the year 1457: and this they continued to do till Faust either died or left off business.
 4. The Latin Bible of 1462, being the second edition of it, now in the French king's library.
 5. "Tully's Offices," in quarto (the rest being all folios), in the year 1465, and 1466, for there are copies in the Bodleian, and the library of Corpus Christi college, Oxon, of both these dates. Some eminent writers have asserted that this is the first printed book.
 6. Other bibles of 1471.
 7. "St. Augustine Civitate Dei," 1473.
 8. "Mercurius Trismegistus de Potestate & Sapientia Dei," in 1503.
 9. "Titus Livius," in 1518, &c.

Add to this, that at the end of Livy is a privilege granted by the emperor Maximilian to Schoeffer, grandson of Faust, for the sole power of printing that author for ten years; and for six years, to all the other books he should print thereafter; in consideration of Faust's having invented the art of printing. This privilege is dated 1518, and signed Jac. Spiegel.

Erasmus, however, in the epistle after that privilege, does not positively aver the fact; he only observes, that the first, or the chief inventor of that art, is held to be J.

Fault. In the advertifement to the faid book, Nic. Carbachius fpeaks to the fame effect as to the privilege, and Erafmus.

As to Guttenberg, Mentel, and Caftor, Naude obferves, the perfon is not yet born that can fay he has ever feen books printed by any of them, before or as early as thofe of Fault. All that is urged on their behalf, is only founded on reports, conjectures, probabilities, forged authorities, and the jealousies of cities againft one another.

Yet Salmuth, in his additions to Pancirollus, cites a public act, by which it appears that Fault, after having invented printing, and fufained it a long time on his own footing; at length took in Guttenburg as partner, to contribute to the expence; which was very great, by reafon the firft books were moft of them printed on vellum, or at leaft on parchment, and after the Chinefe way.

But the caufe is not thus decided: the advocates for Cofter urge divers things, which feem to put him in the place here affigned to Fault. Mr. Ellis, in the Philofophical Tranfactions, fathers books on him prior to any of thofe above referred to Fault, and even fome as early as 1430 and 1432. It is certain, the Haerlemers fhew printed books of that date, which agreeing fo well with the account given by Theod. Scriverius, and others, leaves Mr. Ellis little room to doubt, whether the honour of the invention be his or the other's due. All that belongs to Fault, according to this writer, is the honour of eftablifhing the art in greater luftre and perfection at another place many years after.

But the difficulty lies, either in fhewing why the practice fhould be at a ftand from 1432, to the reviving of it at Mentz by Fault and Schoeffer in 1465, or elfe in giving fome account of the condition and progrefs of this invention during that interval.

Now, Boxhornius, Scriverius, and other authors, exprefly affirm, that fo large a work as the "De Spiegel, Speculum Salutis" of Cofter, fhewn at Haerlem for the firft printed book, could never be his firft effay: he muft have had the art in its rougher rudiments before, and have made many trials on lefs works: no doubt his firft attempts were on loofe fheets, which we may fuppofe were eafily loft. In effect, it muft be allowed no inconfiderable argument in Cofter's behalf, that the rudeft and moft artlefs performances feem to be his. Mr. Ellis mentions fome things of this kind without date, which he had feen in the king's library at St. James's, in that of Bennet college and the Bodleian at Oxford, with all the marks of the utmoft fimplicity, and which might fairly bid for firft effays. There is fomething fo awkward and coarfe in them, that any body almoft might have done them; mere nature being fufficient, without any art or experience at all. The ink was only common writing ink, unartfully fpread upon wooden blocks, very clumsily cut, &c.

By this time we have traced up the art to fuch a ftate, that it may, perhaps, fcarcely feem worth the contefting who it was invented it; and no doubt printing, as it now ftands, owes more to the genius and addrefs of fome of the later improvers than it did to its firft author.

The fame confideration may make us more eafy under our prefent ignorance of the inventors of moft other arts; many of which had fuch fimple unmeaning originals, that it might perhaps be no mighty credit to be eftemed the authors of inventions not lefs artful and ingenious.

We fhall conclude this account of the origin of printing with an abridgment of the history of it, given by the late Mr. Bowyer. This writer obferves, that the honour of having given rife to this art has been claimed by the cities

of Haerlem, Mentz, and Strafburgh. To each of thefe cities it may be afcribed in a qualified fenfe, as they made improvements upon one another. But the real inventor of printing was Laurentius, of Haerlem; who proceeded, however, no farther than to feparate wooden types. His firft effay was about the year 1430; and he died about 1440, after having printed the "Horarium," the "Speculum Belgicum," and two different editions of Donatus. Some of Laurentius's types were ftolen from him by one of his fervants, John Gensfleisch, feniour, who became the firft printer in Mentz, and publifhed, in 1442, "Alexandri Galii Doctrinale," and "Petri-Hifpani Tractatus." Thefe works were executed with wooden types, cut after the model of thofe which he had ftolen. In 1443, Gensfleisch feniour entered into partnership with Fault (who fupplied money), Meidenbachius, and others; and in 1444 they were joined by John Gensfleisch junior, who was diftinguifhed by the name of Guttenberg. Guttenberg, by the affiftance of his brother, Gensfleisch the elder, firft invented cut metal types, with which was printed the earlieft edition of the bible. This edition appeared in 1450, and the completing of it took up feven or eight years. Guttenberg ufed none but either wooden or cut metal types. The carrying of the art to perfection was owing to Peter Schoeffer, the fervant and fon-in-law of Fault, who invented the mode of cafting the types in matrices; and who was probably the firft engraver on copper-plates. The firft book printed with the improved types was "Durandi Rationale," in 1459. More copies of the earlieft books were printed on vellum than paper. This method, however, was foon changed; and paper was introduced for the greateft part of the impreffions, a few only being printed on vellum, for curiofities, and for the purpofe of being illuminated.

With regard to the claim of Strafburgh, it appears that Guttenberg had endeavoured to introduce printing into that city before he joined his brother at Mentz; but without fuccefs. The firft actual printers at Strafburgh were Mentelius and Egleftenius; and there is no certain proof of a fingle book having been printed there till after 1462. The difperfon of the Mentz printers, in that year, occafioned the art to fpread rapidly through Europe; and in 1490 it reached even to Conftantinople. Thofe who wifh to fee this fubject farther difcuffed, and to find the authorities on which this abftract of the rife of printing is founded, may confult Meerman's "Origines Typographicæ," quarto, 1765, and Bowyer's "Origin of Printing," edit. 2.

PRINTING, *Progreff of.* The firft printers, then, whoever they were, made their firft effays on wooden blocks, or forms, after the Chinefe manner.

It is not improbable, fays Mr. Bagford, they might take the hint from ancient medals and feals. To this purpofe, it is obferved, that the arts and fciences, efpecially ftatuary and fculpture, were arrived at fo great perfection among the Romans, at the time when that empire was in its greateft glory, that it is much to be wondered at that the art of printing was not found out among them; an art fo nearly allied to that of the cutting of feals and the dies of medals.

The making of thefe dies, and the ftamping of their coins with them, was, in reality, no other than printing on metal; and their impreffing their feals, cut in cornelians, agates, &c. on wax, was another fpecies of printing on this fubftance. And finally, a third fort of printing among them, was the impreffing the name of the workmen on their pieces of fine earthen-ware.

Montfaucon, in his Antiquities, gives the figures and defcriptions

scriptions of several very large figilla of the Romans, in which the names were all cut in hollow, in capital letters; and he imagines, that the use of these was to mark large earthen vessels with, while the clay was soft, and particularly those large vessels in which the Romans kept their wines. It does not seem that this diligent enquirer into antiquity ever met with any of these figilla with the letters or characters in relief, or standing out in the manner of our modern types for printing, since he mentions none such; yet the remains of the Roman antiquities in terra cotta, or earthen-ware, shew that they had some such, though they were less common than the others; these vessels sometimes being marked with letters going in, though in general they have them all standing out, as must be the case when the impression was given from a figillum cut in creux.

There is now, in the collection of the duke of Richmond, a figillum of the other more rare kind, which brings the discovery very near to that of printing: on this all the letters are raised, as is also the verge or rim of the seal in the manner of our types used this day in printing. The stamp is made of true ancient brass, and has on it the common green coat of ærugo, which distinguishes the true antique medals. The plate is nearly two inches long, and nearly an inch in breadth, and has on the back part a ring for the convenience of holding it for making the impression. The letters stand in two rows; they are the common Roman capitals, very well made, and their faces all stand exactly on the level with one another, and with the surface of the verge of the seal. This seal was exactly of the nature of our method of printing so many letters at once. It contains the name of one Caius Julius Cæcilius Hermias, some private man, as we have no account of any person of this name upon record. It served him probably to set his name to any thing, to save him the trouble of writing; and the name being that of some private man seems also to prove, that these figilla were very common among that people. It was evidently made to be used on parchment, or some other such thin substance; and the manner of using it must have been by first dipping into ink, or some other coloured matter, not plunging it so far as to touch the ground, so that the letters only became marked, and gave their figures on the paper. The ground of this seal is very rough and uneven, and thence also it is plain, that the use of it was not to press down any soft substance, such as clay, or the like; because the imperfection of the ground would, in that case, have been seen; whereas in the use it was really intended for, the ground never gave any impression, and therefore there was no reason for bestowing any pains on the working it even.

The first use of printing among the later ages, was by wooden blocks in this very manner; and it was not till long after this invention, that we learned the way of using separate types for the letters; and these were then called *typi mobiles*, in opposition to the blocks, where the whole page was contained together, which was called *typi fixi*. This signet of the duke of Richmond's, which was found near Rome, is truly and properly one of those *typi fixi*, and prints off its impression on paper with our modern printer's ink, as well as any set of letters cut in this manner can be expected to perform. This seems, therefore, the most ancient sample of printing that we know of; for, by the appearance of the metal, it seems to be of the Higher Empire.

It is plain, by this stamp, that the very essence of printing was known to the Romans; for they had nothing to do, but to have made a stamp, with lines three or four times as long, and containing twenty lines instead of two, to have formed a frame of types that would have printed a whole

page as Coster's wooden blocks, used in printing the book called "Speculum Salutis," which, as some say, is the first book printed in the year 1440, and consisting of pictures of stories out of the bible, with some of the verses underneath each page; being printed from a block of wood, like a wooden cut. This was the first essay of fixed types, from which the moveable, or common separate types were soon deduced; and it seems strange that the Romans, who were as sagacious a people as any in the world, should not as easily have fallen upon the use of separate types, in which the whole art of modern printing consists, from such signets as these, as the later ages from Coster's wooden blocks, which were plainly no other than larger works of the same kind.

Cicero, in his book "De Natura Deorum," has a passage from which Toland supposes that the moderns took the hint of printing. That author orders the types to be made of metal, and calls them *formæ literarum*, the very words used by the first printers to express them. It is plain from Virgil, that brands, with letters of the owner's name, were in use in his time for the marking of cattle. And we have an account of the same artifice that is now used for the painting of cards being used by the emperor Justin, who could not write. There was a smooth board, with holes cut through it, in form of the letters of his name; and when he had occasion to sign any thing, this was laid on the paper, and he marked the letters with a pen or stylus dipped in red ink and directed through the holes. *Philos. Transf. N^o 479, p. 393.*

But others rather imagine the art of printing to have come from the method of making playing cards, which, it is certain, bear a nearer resemblance to the primitive process of printing than seals; as appears from the first specimens of that art above mentioned.

The book at Haerlem, the vocabulary called "Catholicon," and the pieces in the Bodleian and Bennet college, are all performed in this way; and the impression appears to have been given on one side of the leaves; after which the two blank sides were pasted together.

But they soon found the inconveniencies of this method, and therefore bethought themselves of an improvement; which was by making single moveable letters, distinct from one another.

These being first done in wood, gave room for a second improvement; which was the making of them, at length, of metal; and in order to that, cutting moulds, matrices, &c. for casting them.

From this ingenious contrivance we ought to date the origin of the present art of printing, as practised throughout Europe; contradistinguished from the methods of the Chinese abroad, and the card-makers at home, which were the same art, only practised in a different place, or with a different view.

And of this, Schoeffer, or Scheffer, first servant, and afterwards partner, and son-in-law of Faust, at Mentz, above mentioned, is pretty generally allowed the inventor; so that he was properly the first printer with fusile types.

But the art being yet in its infancy, there were some imperfections in the books they printed; among the rest was the want of capital letters: hence they left the places of the initial letters blank, and gave them to the illuminers to paint in gold, or azure, though others say, this was done designedly, to enable them to pass off their books for manuscripts.

Some authors tell us, that Faust carrying a parcel of his bibles to Paris, and offering them to sale as MSS., the French, upon considering the number of books, and their exact conformity with one another, even to a point, and that

the best book-writers could not be near so exact, concluded there was witchcraft in the case; and, by either actually indicting him as a conjuror, or threatening to do so, extorted the secret. And thence the origin of the popular story of Dr. Faustus.

From Mentz, about the year 1462, when it was taken, plundered, and deprived of all its former rights and franchises, the art of printing soon spread itself throughout a good part of Europe; Haerlem and Strasburgh had it very early; which, as authors represent it, occasioned their pretending to the honour of the invention.

From Haerlem it passed to Rome in 1466, where the Roman type was introduced in 1467, which was soon after brought to great perfection; and into England in the reign of Henry VI. by means of Thomas Bouchier, archbishop of Canterbury, who sent R. Tournour, master of the robes, and W. Caxton, merchant, to Haerlem, to learn the art. These privately prevailing with Corfellis, an under-workman, to come over, a press was set up at Oxford.

This account depends on the authority of an old manuscript chronicle, said to be preserved in the archbishop's palace, and cited by Atkins, in his "Original and Growth of Printing in England," published at London in 1664. This chronicle informs us, that the execution of the business intrusted with Tournour and Caxton, cost fifteen hundred marks; and that printing was set up at Oxford before there was any printing press or printer in France, Spain, Italy, or Germany, except the city of Mentz, which claims seniority as to printing even of Haerlem itself, calling herself *Urbem Moguntinam artis typographicæ inventricem primam*; though it is known to be otherwise, that city (as the chronicle adds) gaining that art by the brother of one of the workmen at Haerlem, who had learned it at home of his brother, and afterwards set up for himself at Mentz. This press at Oxford was at least ten years before there was any printing in Europe (except at Haerlem and Mentz), where also it was but new-born. This press at Oxford was afterwards found inconvenient to be the sole printing place in England, as being too far from London and the sea; upon which the king set up a press at St. Alban's, and another at the abbey of Westminster. But the authority of this chronicle has been warmly disputed by Mr. Palmer in his "History of Printing," 1733, book iii.; Dr. Ducarel, in his letter to Meerman, Dr. Middleton, Ames, and others, who maintain that there was no printing in this kingdom till the introduction of it by Caxton, who had acquired it in his travels abroad, about the year 1474, or as some say, 1470 or 1471.

But Mr. Bowyer, in his notes to the Abridgment of Dr. Middleton's "Dissertation on the Origin of Printing in England," hath offered several reasons to shew, that the account given in Atkins's record is not so incredible or improbable as some persons have imagined.

Mr. Meerman, in his learned work already cited, is a strenuous advocate for the authenticity of this record: and he apprehends that the period to which this history relates, must have been between the years 1454 and 1459; because Bouchier was made archbishop of Canterbury in 1454, and Edward IV. succeeded Henry VI. in 1460. This accurate writer has produced a variety of evidence in support of the claims of Corfellis, for which we must refer to his elaborate work, and particularly to his letter in reply to Ducarel, tom. ii. p. 19, &c., and to Mr. Bowyer, *ubi supra*; which evidence derives much confirmation from a book with a date of its impression from Oxford, anno 1468, copies of which are in several public libraries, particularly at Cambridge, Oxford, lord Pembroke's library, &c. This is a small volume of forty-one leaves in quarto, with this title; "Expo-

sitio Sancti Jeronimi in Symbolum Apostolorum ad Papam Laurentium," and at the end are the following words, "Explicit Expositio, &c. impressa Oxoniæ & finita, Anno Domini MCCCCLXVIII. XVII die Decembris."

If the authority of this book be admitted, it is a clear proof and monument of the exercise of printing in Oxford several years before Caxton began to deal in it. Dr. Middleton, indeed, endeavours to shew that the date is a false one; and, not to mention the rest of his arguments, confirms his opinion from this circumstance, that we have no other fruit or production from the press at Oxford for eleven years next following. But this objection is invalidated by two considerations; first, that Corfellis's books may have been lost, a thing by no means uncommon in those days of ignorance; and, secondly, that the civil wars broke out in 1469, which might probably oblige our Oxford printer to shut up his press.

Mr. Bowyer produces a passage from the second part of Shakspeare's Henry VI., as a farther evidence of a more early introduction of printing into England than hath generally been supposed. See also Meerman *ubi supra*, monitum novissimum, prefixed to tom. ii.

The result of the whole is, that this fact doth not at all derogate from the honour of Caxton, who was the first person in England that practised the art of printing with fusile types, and consequently the first who brought it to perfection: whereas Corfellis printed with separate cut types in wood, being the only method which he had learnt at Haerlem.

In 1467, printing was set up in the city of Tours; at Reuthlingen and Venice in 1469; and probably in the same or next year at Paris, where Gering, Crantz, and Friburger, all Germans, invited thither by two doctors of the Sorbonne, set up a press in that learned house.

Hitherto there had been nothing printed but in Latin, and the vulgar tongues; and this first in Roman characters, then in the Gothic, and at last in Italic. But in 1480, or, as some say, in 1476, the Italians cast a set of Greek types; and it was at Venice, or, as some say, at Milan or Florence, that the first editions in that language appeared.

Here we may observe, that the first Greek printing was a few sentences of Tully's Offices at Mentz, in 1465, which were very incorrect. In the same year, some Greek quotations in an edition of Lactantius's Institutes, were neatly printed, in a monastery, in the kingdom of Naples. The first whole Greek book was the Grammar of Constantine Lascaris, at Milan, in 1476. See Bowyer, *ubi supra*, Appendix, N^o 1; or the excellent edition of the Biographia Britannica, by Dr. Kippis, art. *Atkins*, note (A).

The Italians, too, have the honour of the first Hebrew editions, which were printed about the same time with the Greek, at Soncino, a little city in the duchy of Milan; under the direction of two Jewish rabbins, Joshua and Moses, whose works are dated in the year of the world 5244, answering to the year 1484 of the Christian era.

Towards the end of the sixteenth century, there appeared various editions of books in Syriac, Arabic, Persian, Armenian, Coptic, or Egyptian characters; some to gratify the curiosity of the learned, and others for the liturgic uses of the Christians in the Levant: these were printed chiefly at Paris; whither punches and matrices were sent from Constantinople by M. Savary, then ambassador at the Porte.

Out of Europe, the art of printing has been carried into the three other quarters of the world: for Asia, we see impressions of books at Goa, and in the Philippines; at Lima,

FRY AND STEELE'S
SPECIMEN OF PRINTING TYPES.

=====

FIVE LINES PICA.

Manchester.
Manchester;
£123450

~~~~~

FOUR LINES PICA.

**Quousque tandem**  
*Quousque tand*  
**£1234567890**

~~~~~

FRENCH CANON, No. 2.

Quousque tandem abut
Quousque tandem abut
£1234567890

TWO LINES DOUBLE PICA.

Quousque ta
Quousque ta
£ 1 2 3 4 5 6 7

TWO LINES GREAT PRIMER, No. 3.

Quousque tand
em abutere, Ca
Quousque tan-
dem abutere, C
£ 1 2 3 4 5 6 7 8 9

TWO LINES ENGLISH, No. 3.

Quousque tandem a
butere, Catilina, pa-
Quousque tandem
abutere, Catilina,
£ 1 2 3 4 5 6 7 8 9 0

DOUBLE PICA, No. 3.

Quousque tandem abutere,
Catilina, patientia nostra? q
uamdiu nos etiam furor iste
Quousque tandem abutere,
Catilina, patientia nostra?
quamdiu nos etiam furor
£ 1 2 3 4 5 6 7 8 9 0

GREAT PRIMER, No. 3.

Quousque tandem abutere, Catilina,
patientia nostra? quamdiu nōs etiam
furor iste tuus eludet? quem ad fin-
em sese effrenata jactabit audacia?
Quousque tandem abutere, Catilina,
patientia nostra? quamdiu nos etiam
furor iste tuus eludet? quem ad finem
sese effrenata jactabit audacia? nihilne
£ 1 2 3 4 5 6 7 8 9 0

ENGLISH, No. 6.

Quousque tandem abutere, Catilina, patientia
nostra? quamdiu nos etiam furor iste tuus
eludet? quem ad finem sese effrenata jactabit
audacia? nihilne te nocturnum præsidium pa-
latii, nihil urbis vigiliæ, nihil timor populi, ni-
Quousque tandem abutere, Catilina, patientia
nostra? quamdiu nos etiam furor iste tuus
eludet? quem ad finem sese effrenata jactabit
audacia? nihilne te nocturnum præsidium pa-
latii, nihil urbis vigiliæ, nihil timor populi, ni-
£ 1 2 3 4 5 6 7 8 9 0

ENGLISH, No. 7.

The Spirit of the Lord God *is* upon me; because the Lord hath anointed me to preach good tidings unto the meek; he hath sent me to bind up the broken-hearted, to proclaim liberty to the captives, and the opening of the prison to *them that are bound!*

PICA, No. 6.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi se-

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum

£ 1 2 3 4 5 6 7 8 9 0

PICA, No. 7.

1 The Spirit of the Lord God *is* upon me; because the LORD hath anointed me to preach good tidings unto the meek; he hath sent me to bind up the broken-hearted, to proclaim liberty to the captives, and the opening of the prison to *them that are bound*;

2 To proclaim the acceptable year of the LORD, and the day of vengeance of our God; to comfort all that mourn;

PICA, No. 8.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus haben-

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi se-

£ 1 2 3 4 5 6 7 8 9 0

SMALL PICA, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque move-

SMALL PICA, No. 5.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vul-

SMALL PICA, No. 6.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque move-

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? pa-

£ 1 2 3 4 5 6 7 8 9 0

LONG PRIMER, No. 5.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vi-

£ 1 2 3 4 5 6 7 8 9 0

LONG PRIMER, No. 6.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam

£ 1 2 3 4 5 6 7 8 9 0



BURGEOIS, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superi-

£ 1 2 3 4 5 6 7 8 9 0



BURGEOIS, No. 5.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima,

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus? nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore

£ 1 2 3 4 5 6 7 8 9 0



LARGE FACED BREVIER.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit? imo vero etiam in senatum venit: fit publici consilii parti-

£ 1 2 3 4 5 6 7 8 9 0

BREVIER, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit?

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia: nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores? Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit? imo vero etiam in senatum venit:



BREVIER, No. 5.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia: nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit? imo

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit? imo vero etiam in senatum venit:



MINION, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z Æ Æ

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z Æ Æ



MINION, No. 5.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit?



NONPAREIL, No. 3.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit? imo vero etiam in senatum venit: fit publici consilii particeps: notat et designat oculis ad eadem nunquamque nostrum. Nos autem viri fortes

£ 1 2 3 4 5 6 7 8 9 0

NONPAREIL, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus honorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit? imo vero etiam in senatum venit: fit publici consilii particeps: notat et designat oculis ad caedem unumquemque nostrum. Nos autem

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus honorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitra, ris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. Vivit? imo vero etiam in senatum venit: fit publici consilii particeps: notat et designat

£ 1 2 3 4 5 6 7 8 9 0

BLACKS.

FOUR LINES PICA OPEN.

And be it further hereby e
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FOUR LINES PICA.

And be it further hereby e
ther hereby e

TWO LINES GREAT PRIMER.

And be it further hereby enacted, That

TWO LINES ENGLISH.

And be it further hereby enacted, That the M

DOUBLE PICA.

And be it further hereby enacted, That the Mayors, Bai-

GREAT PRIMER.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Officers of every Town

ENGLISH, NO. 1.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Officers of every Town and place corporate, and

ENGLISH, NO. 2.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Officers of every Town and place corporate, and City within

PICA, NO. 1.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Officers of every Town and place corporate, and City within

PICA, NO. 2.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Officers of every Town and place corporate, and City within

SMALL PICA.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Officers of every Town and place corporate, and City within this Realm, being

LONG PRIMER.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Officers of every Town and place corporate, and City within this Realm, being Justice or Justices of Peace, shall have the same authority by virtue of this Act, within the limits and precincts of their

BREVIER.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Officers of every Town and place corporate, and City within this Realm, being Justice or Justices of Peace, shall have the same authority by virtue of this Act, within the limits and precincts of their Jurisdictions, as well out of Sessions, as at their Sessions,

HIBERNIAN.

Cuidh bé dujne cujreay rojme Seancuy no rjnnrjnda-
ct eijce ran mbjč do llmajn no do lojzajplet, jr ld dl-
jzly ejnld aji an rljze jr roljne noctay fjnjnye rta-
jde na eijce, azay dajl na fojnye ajzgly j, do cur go ro-
ljni rjoj; azay do brijz zur žabura nem ajr foruy flya
do denam azay d'rajnējr aji Ejjnn, do mlray aji ruy
cujd da jltjadom azay da hēzcomlan d'ēznac, azay go hā-

SAXONS.



DOUBLE PICA.

Fæder ure þu þe eart on heo-
fenum. Ði þin nama zehalzod.
To-becume þin rice. Gerurðe

GREAT PRIMER.

Fæder ure þu eart on heofenum.
Ði þin nama zehalzod. To-becume
þin rice. Gerurðe þilla on eorþan.

ENGLISH.

Fæder ure þu þe eart on heofenum. Ði þin
nama zehalzod. To-becume þin rice. Gerur-
ðe þin þilla on eorþan. ƿpa ƿpa on heofenum.
Urne dæzhpamlican hlaƿ ƿyle uƿ to dæz.

PICA.

Fæder ure þu þe eart on heofenum. Ði þin nama
zehalzod. To-becume þin rice. Gerurðe þin þilla
on eorþan. ƿpa ƿpa on heofenum. Urne dæzhpam-
lican hlaƿ ƿyle uƿ to dæz. And ƿorƿzƿƿ uƿ ure zyl-

SMALL PICA.

Fæder ure þu þe eart on heofenum. Ði þin nama ze-
halzod. To-becume þin rice. Gerurðe þin þilla on eorþ-
þan. ƿpa ƿpa on heofenum. Urne dæzhpamlican hlaƿ
ƿyle uƿ to dæz. And ƿorƿzƿƿ uƿ ure zyltar. ƿpa ƿpa pe

LONG PRIMER.

Fæder ure þu þe eart on heofenum. Ði þin nama zehalzod. To
becume þin rice. Gerurðe þin þilla on eorþan. ƿpa ƿpa on heo-
fenum. Urne dæzhpamlican hlaƿ ƿyle uƿ to dæz. And ƿorƿzƿƿ
uƿ ure zyltar. ƿpa ƿpa pe ƿorƿzƿƿað urum zyltendum. And ne

BREVIER.

Fæder ure þu þe eart on heofenum. Ði þin nama zehalzod. To-be-
cume þin rice. Gerurðe þin þilla on eorþan. ƿpa ƿpa on heofenum.
Urne dæzhpamlican hlaƿ ƿyle uƿ to dæz. And ƿorƿzƿƿ uƿ ure zyltar.
ƿpa ƿpa pe ƿorƿzƿƿað urum zyltendum. And ne zelaðde þu uƿ on coƿ-
uƿ to dæz. And ƿorƿzƿƿ uƿ ure zyltar. ƿpa ƿpa pe ƿorƿzƿƿað urum



GREEKS.

CODEX ALEXANDRINUS.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙΣ ΟΥΡΑΝΟΙΣ
ΑΓΙΑΣΘΗΤΩ ΤΟ ΟΝΟΜΑ ΣΟΥ ΕΛΘΕΤΟ
Η ΒΑΣΙΛΕΙΑ ΣΟΥ ΓΕΝΗΘΗΤΩ ΤΟ ΘΕΛΗ
ΜΑ ΣΟΥ ΩΣ ΕΝ ΟΥΡΑΝΩ ΚΑΙ ΕΠΙ ΤΗΣ
ΓΗΣ ΤΟΝ ΑΡΤΟΝ ΗΜΩΝ ΤΟΝ ΕΠΤΙΟΥΣΙ
ΟΝ ΛΟC ΗΜΙΝ ΣΗΜΕΡΟΝ ΚΑΙ ΑΦΕC ΗΜ

ΙΝ ΤΑ ΟΦΕΙΛΗΜΑΤΑ ΗΜΩΝ ΩC ΚΑΙ ΗΜ
ΕΙC ΑΦΙΕΜΕΝ ΤΟΙC ΑΦΕΙΛΕΤΑΙC ΗΜΩΝ
ΚΑΙ ΜΗ ΕΙCΕΝΕΓΚΗC ΗΜΑC ΕΙC ΠΤΕΙΡΑC
ΜΟΝ ΑΛΛΑ ƿΥCΧΙ ΗΜΑC ΑΠΤΟ ΤΟΥ ΠΤΟ
ΝΗΡΟΥ ΟΤΙ CΟΥ ΕCΤΙΝ Η ΒΑCΙΛΕΙΑ ΚΑΙ
Η ΔΥΝΑΜΙC ΚΑΙ Η ΔΟΞΑ ΕΙC ΤΟΥC ΑΙΩ
ΝΑC ΑΜΗΝ

This Character was cut by WYNKYN DE WORDE, in exact imitation of that ancient and valuable Manuscript of the New Testament in the British Museum, which was, (as the late Dr. Woide communicated to Dr. Fry), presented, in 1628, to K. Charles I. by Cyrillus Lucaris, Patriarch of Alexandria, but afterwards of Constantinople; and which is supposed to have been written upwards of fourteen hundred years.—See Paterson's Catalogue and Specimens of James's Foundry, sold 1752, p. [10].

DOUBLE PICA.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙC ΟΥΡΑΝΟΙC· ᾧ
γιαθήτω τὸ ὄνομά σου. Ελθέτω
ἡ βασιλεία σου· γενηθήτω τὸ θέλημα

GREAT PRIMER.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙC ΟΥΡΑΝΟΙC· ἁγιασθήτω
τὸ ὄνομά σου. Ελθέτω ἡ βασιλεία σου·
γενηθήτω τὸ θέλημά σου, ὡς ἐν οὐρανῶ, καὶ ἐπὶ

ENGLISH.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙC ὙΡΑΝΟΙC· ἁγιασθήτω το ὄνο-
μά σε. Ἐλθέτω ἡ βασιλεία σε· γενηθήτω τὸ θέ-
λημά σε, ὡς ἐν ὕρανῶ, καὶ ἐπὶ τῆς γῆς. Τὸν ἄρτον ἡ-

PICA.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙC ΟΥΡΑΝΟΙC· ἁγιασθήτω τὸ ὄνομά σου.
Ελθέτω ἡ βασιλεία σου· γενηθήτω τὸ θέλημά σου, ὡς ἐν
οὐρανῶ, καὶ ἐπὶ τῆς γῆς. Τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν

SMALL PICA.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙC ΟΥΡΑΝΟΙC· ἁγιασθήτω τὸ ὄνομά σου. Ἐλ-
θέτω ἡ βασιλεία σου· γενηθήτω τὸ θέλημά σου, ὡς ἐν οὐρα-
νῶ, καὶ ἐπὶ τῆς γῆς. Τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν σή-
μερον. Καὶ ἄφεC ἡμῖν τὰ ὀφειλήματα ἡμῶν, ὡς καὶ ἡμεῖC ἀφίε-

LONG PRIMER.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙC ΟΥΡΑΝΟΙC· ἁγιασθήτω τὸ ὄνομά σε. Ἐλθέτω ἡ
βασιλεία σε· γενηθήτω τὸ θέλημά σε, ὡς ἐν ὕρανῶ, καὶ ἐπὶ τῆς
γῆς. Τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν σήμερον. Καὶ ἄφεC ἡμῖν τὰ
ὀφειλήματα ἡμῶν, ὡς καὶ ἡμεῖC ἀφίεμεν τοῖC ὀφειλέταιC ἡμῶν. Καὶ μὴ

BREVIER.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙC ΟΥΡΑΝΟΙC· ἁγιασθήτω τὸ ὄνομά σου. Ἐλθέτω ἡ βασιλεία
σου· γενηθήτω τὸ θέλημά σε, ὡς ἐν ὕρανῶ, καὶ ἐπὶ τῆς γῆς. Τὸν ἄρτον ἡμῶν
τὸν ἐπιούσιον δὸς ἡμῖν σήμερον. Καὶ ἄφεC ἡμῖν τὰ ὀφειλήματα ἡμῶν, ὡς καὶ ἡμεῖC
ἀφίεμεν τοῖC ὀφειλέταιC ἡμῶν. Καὶ μὴ εἰσενέγκηC ἡμᾶC εἰC πειρασμόν, ἀλλὰ ῥυ-

NONPAREIL.

ΠΑΤΕΡ ΗΜΩΝ Ο ΕΝ ΤΟΙC ΟΥΡΑΝΟΙC· ἁγιασθήτω το ὄνομα σε. Ἐλθέτω ἡ βασιλεία σου· γενηθήτω το
θέλημα σου, ὡς ἐν ὕρανῶ, καὶ ἐπὶ τῆς γῆς. Τὸν ἄρτον ἡμῶν τὸν ἐπιούσιον δὸς ἡμῖν σήμερον. Καὶ
ἄφεC ἡμῖν τὰ ὀφειλήματα ἡμῶν, ὡς καὶ ἡμεῖC ἀφίεμεν τοῖC ὀφειλέταιC ἡμῶν. Καὶ μὴ εἰσενέγκηC ἡ-
μαC εἰC πειρασμόν, ἀλλὰ ῥυσαι ἡμαC ἀπὸ τοῦ πονηροῦ· ὅτι σου ἐστὶν ἡ βασιλεία, καὶ ἡ δυνάμειC, καὶ

HEBREWS.

TWO LINES GREAT PRIMER.

בראשית ברא אלהים
את השמים ואת

TWO LINES GREAT PRIMER, WITH POINTS.

בראשית ברא אלהים
את השמים ואת

TWO LINES ENGLISH.

בראשת ברא אלהים את
השמים ואת הארץ : והארץ

TWO LINES ENGLISH, WITH POINTS.

בראשת ברא אלהים את
השמים ואת הארץ : והארץ

DOUBLE PICA, NO. 1.

בראשית ברא אלהים את השמים
ואתה ארץ : והארץ היתה תהו ובהו
וחשך על-פני תהום ורוח אלהים מר-

DOUBLE PICA, NO. 2.

בראשית ברא אלהים את השמים
ואת הארץ : והארץ היתה תהו ובהו
וחשך על-פני תהום ורוח אלהים

DOUBLE PICA, NO. 2, WITH POINTS.

בראשית ברא אלהים את השמים
ואת הארץ : והארץ היתה תהו ובהו
וחשך על-פני תהום ורוח אלהים

ENGLISH, NO. 1.

בראשית ברא אלהים את השמים ואת הארץ :
והארץ היתה תהו ובהו וחשך על-פני תהום ורוח
אלהים מרחפת על-פני המים : ויאמר אלהים יהי

ENGLISH, NO. 2.

בראשית ברא אלהים את השמים ואת הארץ :
והארץ היתה תהו ובהו וחשך על-פני תהום ורוח
אלהים מרחפת על-פני המים : ויאמר אלהים יהי

ENGLISH, NO. 2, WITH POINTS.

בראשית ברא אלהים את השמים ואת הארץ :
והארץ היתה תהו ובהו וחשך על-פני תהום ורוח
אלהים מרחפת על-פני המים : ויאמר אלהים יהי

PICA.

בראשית ברא אלהים את השמים ואת הארץ : והארץ
היתה תהו ובהו וחשך על-פני תהום ורוח אלהים מרחפת
על-פני המים : ויאמר אלהים יהי אור ויהי-אור : וירא אלהים

SMALL PICA.

בראשית ברא אלהים את השמים ואת הארץ : והארץ היתה תהו ובהו
וחשך על-פני תהום ורוח אלהים מרחפת על-פני המים : ויאמר אלהים
יהי אור ויהי-אור : וירא אלהים את-האור כי-טוב וכברל אלהים בין

LONG PRIMER.

בראשית ברא אלהים את השמים ואת הארץ : והארץ היתה תהו
ובהו וחשך על-פני תהום ורוח אלהים מרחפת על-פני המים : ויאמר
אלהים יהי אור ויהי-אור : וירא אלהים את-האור כי-טוב וכברל אל-
הים בין האור ובין החשך : ויקרא אלהים לאור יום ולחשך קרא לילך

BOURGEOIS.

בראשית ברא אלהים את השמים ואת הארץ : והארץ היתה תהו ובהו וחשך
על-פני תהום ורוח אלהים מרחפת על-פני המים : ויאמר אלהים יהי אור
ויהי-אור : וירא אלהים את-האור כי-טוב וכברל אלהים בין האור ובין החשך :
ויקרא אלהים לאור יום ולחשך קרא לילה ויהי-ערב ויהי-בקר יום אחד :
ויאמר אלהים יהי רקיע בהוץ. המים ויהי מבדיל בין מים למים : וישע

BREVIER.

בראשית ברא אלהים את השמים ואת הארץ : והארץ היתה תהו ובהו וחשך על-פני
תהום ורוח אלהים מרחפת על-פני המים : ויאמר אלהים יהי אור ויהי-אור : וירא
אלהים את-האור כי-טוב וכברל אלהים בין האור ובין החשך : ויקרא אלהים לאור
יום ולחשך קרא לילה ויהי-ערב ויהי-בקר יום אחד : ויאמר אלהים יהי רקיע בתוך
המים ויהי מבדיל בין מים למים : ויעש אלהים את-הרקיע וכברל בין המים אשר מתחת
לרקיע ובין המים אשר מעל לרקיע ויהי-כן : ויקרא אלהים לרקיע שמים ויהי-ערב

SMALL PICA RABBINICAL.

בראשית ברא אלהים את השמים ואת הארץ : והארץ היתה תהו ובהו וחשך
על פני תהום ורוח אלהים מרחפת על פני המים : ויאמר אלהים יהי אור ויהי
אור : וירא אלהים את האור כי טוב וכברל אלהים בין האור ובין החשך : ויקרא
אלהים לאור יום ולחשך קרא לילה ויהי ערב ויהי בקר יום אחד : ויאמר אלהים
יהי רקיע בתוך המים ויהי מבדיל בין מים למים : ויעש אלהים את הרקיע וכברל
בין המים אשר מתחת לרקיע ובין המים אשר מעל לרקיע ויהי כן : ויקרא

Specimen of Printing Types,

BY

ALEXANDER WILSON & SONS,

Letter Founders, Glasgow.

Five-line Pica.

ABCD
abcdef

Four-line Pica.

ABCDE
abcdefgi

Two-line Great Primer.

ABCDEF

Two-line English, Ornamented.

ABCDEFGHI
JKLMNOPQ

Two-line Long Primer.

ABCDEFGHIJK
ABCDEFGHIJ

Two-line Bourgeois.

ABCDEFGHIJKLMN
OPQRSTUVWXYZÆ

Two-line Brevier and Minion.

ABCDEFGHIJKLMNO

Two-line Nonpareil.

ABCDEFGHIJKLMNOPQ

Two-line Pearl.

ABCDEFGHIJKLMNOPQRSTU

Two-line Brevier, Open.

ABCDEFGHIJKLM
ABCDEFGHIJKL

Two-line Nonpareil, Open.

ABCDEFGHIJKLMNOPQ
ABCDEFGHIJKLMNOPQ

Two-line Pearl, Open.

ABCDEFGHIJKLMNOPQRSTU
ABCDEFGHIJKLMNOPQRST

French Canon.

**Quousque
tandem ab
ABCDEI**

Two-line Great Primer.

**Quousque tan
dem abutere o
Catilina, pati-
entia, nostra?
ABCDEFGH**

Two-line English.

**Quousque tandem
abutere Catalina, p
atientia nostra? qu
ABCDEFGHIKL**

Italic.

*Quousque tandem ab
utere, Catilina, pati-
entia nostra? quamd
ABCDEFGHIK*

Double Pica.

**Quousque tandem abutere,
Catilina, patientia nostra?
quamdiu nos etiam furor
iste tuus eludet? quem ad
ABCDEFGHIJKL
ABCDEFGHIJKLMNOPS
0 1 2 3 4 5 6 7 8 9**

Italic.

*Quousque tandem abutere, Ca-
tilina, patientia nostra? quam-
diu nos etiam furor iste tuus
eludet? quem ad finem sese
ABCDEFGHIJKL*

Great Primer.

**Quousque tandem abutere, Cati-
lina, patientia nostra? quamdiu
nos etiam furor iste tuus eludet?
quem ad finem sese effrenata jac-
tabit audacia? nihilne te noctur-
num præsidium palatii, nihil urbis
ABCDEFGHIJKLMN
ABCDEFGHIJKLMNOPS
0 1 2 3 4 5 6 7 8 9**

Italic.

*Quousque tandem abutere, Catili-
na, patientia nostra? quamdiu nos
etiam furor iste tuus eludet? quem
ad finem sese effrenata jactabit au-
dacia? nihilne te nocturnum præ-
sidium palatii, nihil urbis vigiliæ,
ABCDEFGHIJKLMN*

ENGLISH, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil ho-

A B C D E F G H I J K L M N O P Q R

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

0 1 2 3 4 5 6 7 8 9

ENGLISH, No. 5.

Quosque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis?

English Italic.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis?

A B C D E F G H I J K L M N O P Q R

PICA, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium

A B C D E F G H I J K L M N O P Q R S T

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z Æ Æ

0 1 2 3 4 5 6 7 8 9

PICA, No. 5.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid pro-

Pica Italic.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid pro-

A B C D E F G H I J K L M N O P Q R S T

SMALL PICA; No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilia ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelli-

A B C D E F G H I J K L M N O P Q R S T U V W

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z Æ Æ

0 1 2 3 4 5 6 7 8 9

Small Pica Italic.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum præsidium palatii, nihil urbis vigiliæ, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit, hic tamen vivit. vivit? immo vero etiam in senatum venit: fit pub-

A B C D E F G H I J K L M N O P Q R S T U V W

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit, hic tamen vivit. vivit? immo vero etiam in senatum venit

LONG PRIMER, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit, hic tamen vivit. vivit? immo vero etiam in senatum venit: fit publici consilii

A B C D E F G H I J K L M N O P Q R S T U V W X Y

Long Primer Italic, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit, hic tamen vivit. vivit? immo vero etiam in senatum venit: fit publici consilii

*A B C D E F G H I J K L M N O P Q R S T U V W X
A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A E*

LONG PRIMER, No. 5.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. vivit? immo vero etiam in senatum venit: fit publici consilii particeps: notat et

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A E

0 1 2 3 4 5 6 7 8 9

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit? vivit imo vero

Long Primer Italic, No. 5.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. vivit? immo vero etiam in senatum venit: fit publici consilii particeps: notat et designat oculis ad eadem unumquem-

NEW BOURGEOIS ROMAN, No. 4.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. vivit? immo vero etiam in senatum venit: fit publici consilii particeps: notat et designat oculis ad

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A E

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A E

SMALL FACED BOURGEOIS, No. 3.

Quousque tandem abutere, Catilina, patientia nostra? quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. vivit? immo vero etiam in senatum venit: fit publici consilii particeps: notat et designat oculis ad eadem unumquemque nostrum. Nos autem

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z A E

Bourgeois Italic.

Quousque tandem abutere, Catilina, patientia nostra, quamdiu nos etiam furor iste tuus eludet? quem ad finem sese effrenata jactabit audacia? nihilne te nocturnum praesidium palatii, nihil urbis vigiliae, nihil timor populi, nihil consensus bonorum omnium, nihil hic munitissimus habendi senatus locus, nihil horum ora vultusque moverunt? patere tua consilia non sentis? constrictam jam omnium horum conscientia teneri conjurationem tuam non vides? quid proxima, quid superiore nocte egeris, ubi fueris, quos convocaveris, quid consilii ceperis, quem nostrum ignorare arbitraris? O tempora, o mores! Senatus hoc intelligit, consul vidit: hic tamen vivit. vivit? immo vero etiam in senatum venit: fit publici consilii particeps: notat et designat oculis ad eadem unumquemque nostrum. Nos autem viri

A B C D E F G H I J K L M N O P Q R S T U V W X Y Z

ΕΔΕΙ μὲν, ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλ', ὁ βέλτισον ἕκαστος ἠγεῖτο τοῦτ' ἀποφαίνεσθαι ἄλλως τε καὶ περὶ κοινῶν

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠ

English Greek.

ΕΔΕΙ μὲν, ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλὰ ὁ βέλτισον ἕκαστος ἠγεῖτο, τοῦτ' ἀποφαίνεσθαι ἄλλως τε καὶ περὶ κοινῶν πραγμάτων καὶ μεγάλων ὑμῶν βεβουμένων. ἐπειδὴ δὲ ἔνιοι τὰ μὲν φιλονεικία,

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥ

Pica Greek.

ΕΔΕΙ μὲν ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλ' ὁ βέλτισον ἕκαστος ἠγεῖτο, τοῦτ' ἀποφαίνεσθαι. ἄλλως τε καὶ περὶ κοινῶν πραγμάτων καὶ μεγάλων ὑμῶν βεβουμένων, ἐπειδὴ δὲ ἔνιοι, τὰ μὲν, φιλονεικία, τὰ δὲ ἢ τινι δήποτ' αἰτία, προάγονται λέγειν, ὑμᾶς, ὦ ἄνδρες Ἀθηναῖοι, τὸς πολλὰς δεῖ, πάντα τὰλλ' ἀφέντας, ἃ τῇ πόλει νομίζετε συμφέρειν,

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ

Small Pica Greek.

ΕΔΕΙ μὲν ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλ' ὁ βέλτισον ἕκαστος ἠγεῖτο, τοῦτ' ἀποφαινεσθαι. ἄλλως τε καὶ περὶ κοινῶν πραγμάτων καὶ μεγάλων ὑμῶν βεβουμένων. ἐπειδὴ δὲ ἔνιοι, τὰ μὲν, φιλονεικία, τὰ δὲ ἢ τινι δήποτ' αἰτία, προάγονται λέγειν, ὑμᾶς, ὦ ἄνδρες Ἀθηναῖοι, τὸς πολλὰς δεῖ, πάντα τὰλλ' ἀφέντας, ἃ τῇ πόλει νομίζετε συμφέρειν, ταῦτα καὶ ψηφίζεσθαι καὶ πράττειν. ἢ μὲν οὖν σπεδῆ, περὶ τῶν ἐν Χερρόνησῳ

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ

Long Primer Greek.

ΕΔΕΙ μὲν, ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλ', ὁ βέλτισον ἕκαστος ἠγεῖτο, τοῦτ' ἀποφαινεσθαι. ἄλλως τε καὶ περὶ κοινῶν πραγμάτων καὶ μεγάλων ὑμῶν βεβουμένων. ἐπειδὴ δὲ ἔνιοι, τὰ μὲν, φιλονεικία, τὰ δὲ ἢ τινι δήποτ' αἰτία, προάγονται λέγειν, ὑμᾶς, ὦ ἄνδρες Ἀθηναῖοι, τὸς πολλὰς δεῖ, πάντα τὰλλ' ἀφέντας, ἃ τῇ πόλει νομίζετε συμφέρειν, ταῦτα καὶ ψηφίζεσθαι,

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ

ΕΔΕΙ μὲν, ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλ', ὁ βέλτισον ἕκαστος ἠγεῖτο, τοῦτ' ἀποφαινεσθαι. ἄλλως τε καὶ περὶ κοινῶν πραγμάτων, καὶ μεγάλων ὑμῶν βεβουμένων. ἐπειδὴ δὲ ἔνιοι, τὰ μὲν, φιλονεικία, τὰ δὲ ἢ τινι δήποτ' αἰτία, προάγονται λέγειν, ὑμᾶς, ὦ ἄνδρες Ἀθηναῖοι, τὸς πολλὰς δεῖ, πάντα τὰλλ' ἀφέντας, ἃ τῇ πόλει νομίζετε συμφέρειν, ταῦτα καὶ ψηφίζεσθαι καὶ πράττειν. ἢ μὲν οὖν σπεδῆ, περὶ τῶν ἐν

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ

Brevier Greek. No 1.

ΕΔΕΙ μὲν, ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλ', ὁ βέλτισον ἕκαστος ἠγεῖτο, τοῦτ' ἀποφαινεσθαι. ἄλλως τε καὶ περὶ κοινῶν πραγμάτων καὶ μεγάλων ὑμῶν βεβουμένων. ἐπειδὴ δὲ ἔνιοι, τὰ μὲν, φιλονεικία, τὰ δὲ ἢ τινι δήποτ' αἰτία, προάγονται λέγειν, ὑμᾶς, ὦ ἄνδρες Ἀθηναῖοι, τὸς πολλὰς δεῖ, πάντα τὰλλ' ἀφέντας, ἃ τῇ πόλει νομίζετε συμφέρειν, ταῦτα καὶ ψηφίζεσθαι καὶ πράττειν. ἢ μὲν οὖν σπεδῆ, περὶ τῶν ἐν Χερρόνησῳ πραγμάτων ἐστὶ, καὶ τῆς στρατείας, ἣν ἐνδέκατον μῆνα τούτου, Φίλιππος ἐν Θράκη ποιῆται. τῶν δὲ λόγων οἱ πλείστοι, περὶ ὧν Διοσκρίτης πράττει καὶ μέλλει ποιεῖν, εἰρηται. ἐγὼ δὲ, ὅσα μὲν τις αἰτιάται τινὰ τούτων, οὐς, κατὰ τὸς νόμους, ἐφ' ὑμῖν εἶναι, ὅσα

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ

Minion Greek.

ΕΔΕΙ μὲν, ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλ', ὁ βέλτισον ἕκαστος ἠγεῖτο, τοῦτ' ἀποφαινεσθαι. ἄλλως τε καὶ περὶ κοινῶν πραγμάτων καὶ μεγάλων ὑμῶν βεβουμένων. ἐπειδὴ δὲ ἔνιοι, τὰ μὲν, φιλονεικία, τὰ δὲ ἢ τινι δήποτ' αἰτία, προάγονται λέγειν, ὑμᾶς, ὦ ἄνδρες Ἀθηναῖοι, τὸς πολλὰς δεῖ, πάντα τὰλλ' ἀφέντας, ἃ τῇ πόλει νομίζετε συμφέρειν, ταῦτα καὶ ψηφίζεσθαι καὶ πράττειν. ἢ μὲν οὖν σπεδῆ, περὶ τῶν ἐν Χερρόνησῳ πραγμάτων ἐστὶ, καὶ τῆς στρατείας, ἣν ἐνδέκατον μῆνα τούτου, Φίλιππος ἐν Θράκη ποιῆται. τῶν δὲ λόγων οἱ πλείστοι, περὶ ὧν Διοσκρίτης πράττει καὶ μέλλει ποιεῖν, εἰρηται. ἐγὼ δὲ, ὅσα

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ

Nonpareil Greek.

ΕΔΕΙ μὲν, ὦ ἄνδρες Ἀθηναῖοι, τὸς λέγοντας ἅπαντας ἐν ὑμῖν, μήτε πρὸς ἔχθραν ποιῆσθαι λόγον μηδένα, μήτε πρὸς χάριν. ἀλλ', ὁ βέλτισον ἕκαστος ἠγεῖτο, τοῦτ' ἀποφαινεσθαι. ἄλλως τε καὶ περὶ κοινῶν πραγμάτων καὶ μεγάλων ὑμῶν βεβουμένων. ἐπειδὴ δὲ ἔνιοι, τὰ μὲν, φιλονεικία, τὰ δὲ ἢ τινι δήποτ' αἰτία, προάγονται λέγειν, ὑμᾶς, ὦ ἄνδρες Ἀθηναῖοι, τὸς πολλὰς δεῖ, πάντα τὰλλ' ἀφέντας, ἃ τῇ πόλει νομίζετε συμφέρειν, ταῦτα καὶ ψηφίζεσθαι καὶ πράττειν. ἢ μὲν οὖν σπεδῆ, περὶ τῶν ἐν Χερρόνησῳ πραγμάτων ἐστὶ, καὶ τῆς στρατείας, ἣν ἐνδέκατον μῆνα τούτου, Φίλιππος ἐν Θράκη ποιῆται. τῶν δὲ λόγων οἱ πλείστοι, περὶ ὧν Διοσκρίτης πράττει καὶ μέλλει ποιεῖν, εἰρηται. ἐγὼ δὲ, ὅσα

ΑΒΓΔΕΖΗΘΙΚΛΜΝΞΟΠΡΣΤΥΦΧΨΩ

ENGLISH SAXON.

Fæder upe þe þe eart on heofenum. Si þin nama gehalgod. To-becume þin rice. Geruþde þin willa on eorþan. gpa gpa on heofenum. Urne dæghpamlican hlaf gyle

PICA SAXON.

Fæder upe þe þe eart on heofenum. Si þin nama gehalgod. To-becume þin rice. Geruþde þin willa on eorþan. gpa gpa on heofenum. Urne dæghpamlican hlaf gyle ur to dæg.

SMALL PICA SAXON.

Fæder upe þe þe eart on heofenum. Si þin nama gehalgod. To-becume þin rice. Geruþde þin willa on eorþan. gpa gpa on heofenum. Urne dæghpamlican hlaf gyle ur to dæg. And forþær ur upe gyltar. gpa gpa pe forþær urum gyltendum.

LONG PRIMER SAXON.

Fæder upe þe þe eart on heofenum. Si þin nama gehalgod. To-becume þin rice. Geruþde þin willa on eorþan. gpa gpa on heofenum. Urne dæghpamlican hlaf gyle ur no dæg. And forþær ur upe gyltar. gpa gpa pe forþær urum gyltendum. And ne gelædde þu ur on corþnunge. ac alyr ur or ýfele. do ðlice. Fæder uer

Two Lines English Hebrew.

בראשית ברא אלהים את
השמים ואת הארץ והארץ

Double Pica Hebrew.

שית ברא אלהים את השמים
:והארץ היתה תהו ובהו ברא

Great Primer Hebrew.

יית ברא אלהים את השמים ואת
:והארץ היתה תהו ובהו והשך בראש
תהום ורוח אלהים מרחפת על הארץ

English Hebrew.

שית ברא אלהים את השמים ואת הארץ :
תהו ובהו והשך על-פני תהום סרוחי ברא
מת על-פני המים : ויאמר אלהיו יהי הארץ הי

Pica Hebrew.

ברא אלהים את השמים ואת הארץ : והארץ
והשך על-פני תהום ורוח אלהים מרחפת בראשית
אלהים יהי אור ויהי-אור : וירא אל- היתה תהו ובהו

Small Pica Hebrew.

ברא אלהים את השמים ואת הארץ : והארץ היתה תהו
תהום ורוח אלהים מרחפת על-פני המים : ויאמר בראשית
: וירא אלהים את-האור כי-טוב ויבדל אל- והבו והשך על-פני
ויקרא אלהים לאור יום ולחשך קרא אלהים יהי אור ויהי-אור

Long Primer Hebrew.

ברא אלהים את השמים ואת הארץ : והארץ היתה תהו
תהום ורוח אלהים מרחפת על-פני המים : ויאמר בראשית
: וירא אלהים את-האור כי-טוב ויבדל אל- והבו והשך על-פני
אלהים לאור יום ולחשך קרא אלהים יהי אור ויהי-אור
אלהים יהי רקיע בתוך הים בין האור ובין החשך : ויקרא

Brevier Hebrew.

ברא אלהים את השמים ואת הארץ : והארץ היתה תהו ובהו והשך על-פני
מרחפת על-פני המים : ויאמר אלהים יהי אור ויהי-אור : וירא אלהים בראשית
בין האור ובין החשך : ויקרא אלהים לאור יום ולחשך תהום ורוח אלהים
הרקיע ויבדל בין המים אשר מתחת לרקיע את-האור כי-טוב ויבדל אלהים
לרקיע שמים ויהי ערב ויהי-בקר יום אחד : ויעש אלהי תסא

Minion Hebrew.

בראשית ברא אלהים את השמים ואת הארץ : והארץ היתה תהו ובהו והשך על-פני
תהום ורוח אלהים מרחפת על-פני המים : ויאמר אלהים יהי אור ויהי-אור : וירא אלהים
את-האור כי-טוב ויבדל אלהים בין האור ובין החשך : ויקרא אלהים לאור יום ולחשך
קרא לילה ויהי-ערב ויהי-בקר יום אחד : ויאמר אלהים יהי רקיע בתוך המים ויהי

Nonpareil Hebrew.

בראשית ברא אלהים את השמים ואת הארץ : והארץ היתה תהו ובהו והשך אל-פני
תהום ורוח אלהים מרחפת על-פני המים : ויאמר אלהים יהי אור ויהי-אור : וירא אלהים
את-האור כי-טוב ויבדל אלהים בין האור ובין החשך : ויקרא אלהים לאור יום ולחשך
קרא לילה ויהי ערב ויהי-בקר יום אחד : ויאמר אלהים יהי רקיע בתוך המים ויהי

TWO LINES GREAT PRIMER BLACK.

And be it further
A B C D E F G

DOUBLE PICA BLACK.

And be it further hereby ena
A B C D E F G H I L M N O

GREAT PRIMER BLACK.

And be it further hereby en-
acted, That the Mayors, Bail
A B C D E F G H I K L M

ENGLISH BLACK. No 2.

And be it further hereby enacted, That
the Mayors, Bailiffs, or other head Offi-
cers of every Town and place corporate,
A B C D E F G H I K L M N O P Q R

PICA BLACK.

And be it further hereby enacted, That
the Mayors, Bailiffs, or other head Offi-
cers of every Town and place corporate,
A B C D E F G H I K L M N O P Q R

LONG PRIMER BLACK. No 1.

And be it further hereby enacted, That the Mayors,
Bailiffs, or other head Officers of every town and place
corporate, and City within this Realm, being Justice
A B C D E F G H I K L M N O P Q R S T U

LONG PRIMER BLACK. No 2.

And be it further hereby enacted, That the Mayors, Bailiffs, or
other head Officers of every Town and place corporate, and City
within this Realm, being Justice or Justices of Peace, shall
A B C D E F G H I K L M N O P Q R S T U V W X Y Z

BREVIER BLACK.

And be it further hereby enacted, That the Mayors, Bailiffs, or
other head Officers of every Town and place corporate, and
City within this Realm, being Justice or Justices of Peace,
shall have the same authority by vertue of this Act, within the
A B C D E F G H I K L M N O P Q R S T U V W X Y Z

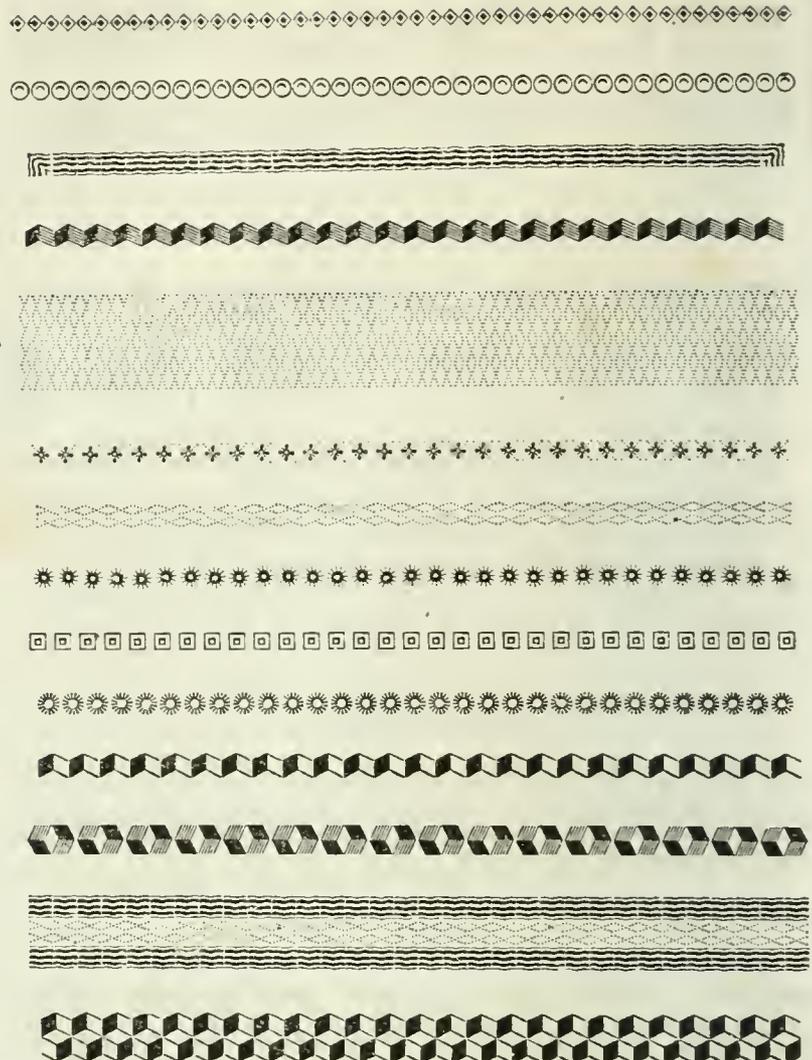
NONPAREIL BLACK.

And be it further hereby enacted, That the Mayors, Bailiffs, or other head Offi-
cers of every Town and place corporate, and City within this Realm, being Justice
or Justices of Peace, shall have the same authority by vertue of this Act, within
the limits and precincts of their Jurisdictions, as well out of Sessions, as at their
Sessions, if they hold any, as is herein limited, prescribed and appointed to
A B C D E F G H I K L M N O P Q R S T U V W X Y Z

SCRIPT.

The art of Printing is but three hundred and sixty five years old; and it long remained an undetermined point between A B C D E F G H I J K

Minion.



FLOWERS.

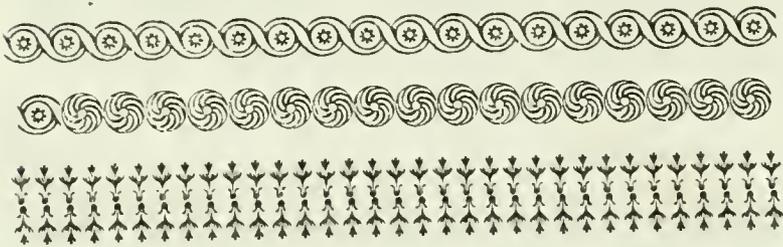
Two Lines English.



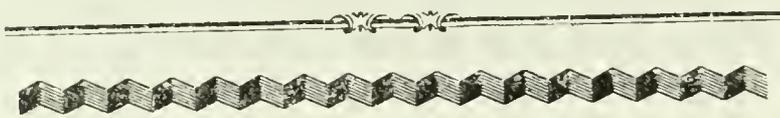
English.



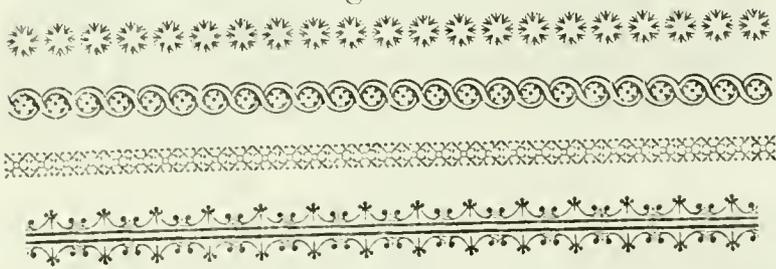
Pica.



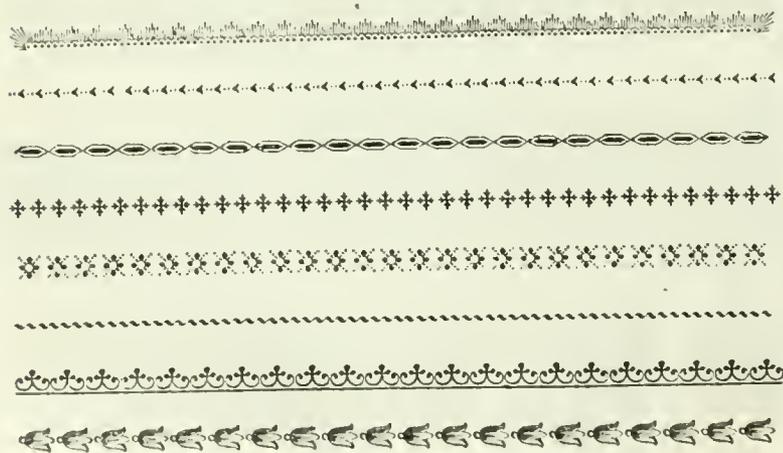
Small Pica.



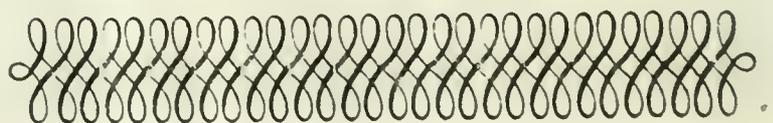
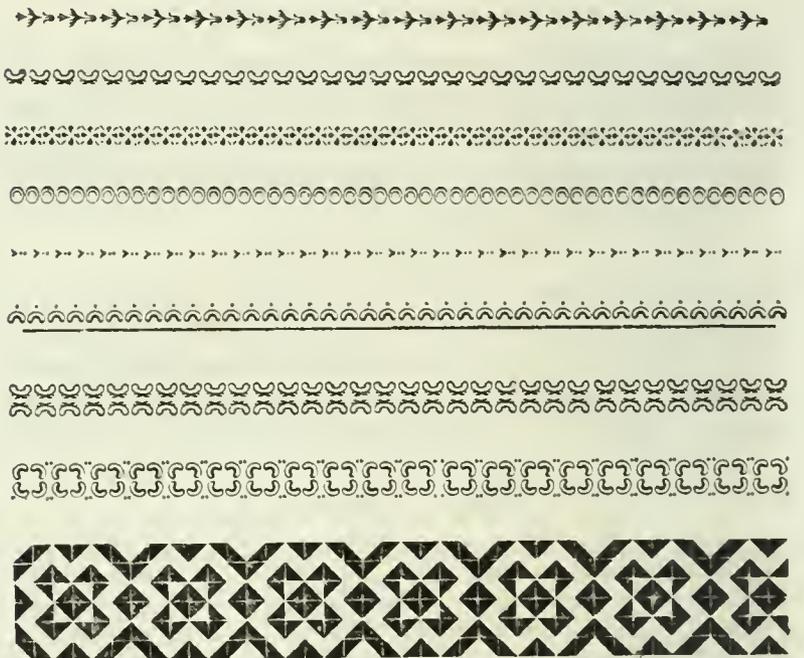
Long Primer.



Brevier.



Nonpareil.



PRINTING.

Lima, Boston, Philadelphia, Mexico, &c. for America; and at Morocco for Africa.

The Turks, indeed, are said rigorously to prohibit printing throughout their empire, as imagining that the too free communication with books might occasion some change in religion or government, but this is to be understood with some limitation: and it is certain that the Jews have several editions of their books printed at Constantinople, Theffalonica, &c.

PRINTING, *Method of.* For the printing letters see the annexed specimen.

For the method of forming and casting them, see *Letter Foundery*.

And for the art of engraving the puncheons, matrices, &c. in order thereto, under the articles ENGRAVING, PUNCHEON, MATRICE, &c.

The workmen employed in the art of printing are of two kinds; *compositors*, who range and dispose the letters into words, lines, passages, &c. according to the copy delivered them by the author; and *pressmen*, who apply ink upon the same, and take off the impression. See COMPOSITION, &c.

Office of the Compositor.—The types, being cast, &c. are distributed, each kind by itself, among the divisions of two long wooden frames, an upper and under one, called *cases*; each of which is divided into little cells, or boxes, of different sizes.

The boxes of the upper cases are in number ninety-eight; and in these are disposed the capitals, small capitals, accented letters, &c. In the cells of the lower case, which are fifty-four, are disposed the common running letters, with the points, commas, spaces, quadrats, &c.

Each case is placed a little aslope, like a reading-desk, that the operator may reach the upper boxes the better, and be in less danger of mixing the letters by stretching his arm over them.

The compositor's post is against the middle of the case, and he works standing, holding an instrument, usually made of iron, called the *composing-stick*, in one hand; with the other he takes the types as he requires them, out of the boxes; ranges them on a slip of brass, called a *rule*, in his composing-stick; and, putting a space, to make a blank between each two words, forms one line after another, till the stick being full, he empties it out upon another instrument, called the *galley*; several of which ranged and wedged tight in an iron frame, called a *chase*, are ready for the press.

This short view of composing may need to be farther illustrated and enlarged upon. The composing-stick, then, (represented *Plate IV. Printing, fig. 5.*) consists of a plate, or slip of iron, brass, wood, &c. more or less broad, and contrived so as to be made more or less long, according to the width of the page, and the number of lines to be composed in it.

From the right side of this plate arises a ledge *aa*, about half an inch high, running the whole length of the plate, and serving to sustain the letters, the sides of which are to rest against it; from the same plate likewise arise three other lesser pieces, *b* and *c, c*, two of which, *c, c*, are contrived to slide along it, so that the two pieces may be either approached or withdrawn at pleasure, to adjust the length of the line to the measure intended. Add, that where marginal notes, references, &c. are required in a work, the two sliding-pieces, *c, c*, are opened in the composing-stick to a proper distance from each other.

Before the workman proceeds to compose, a rule, or thin slip of brass plate, cut to the length of the line, and of the same height as the letter, is placed in the composing-

stick against the ledge of it, for the letter to bear immediately against.

Things thus prepared, the compositor having the copy lying before him, and the stick in his left hand, with the right he picks up the letters, spaces, &c. and places them against the rule; while with the thumb of the left he presses them close to the upper screw, or cheek: and thus keeps them tight and steady; while the other hand is constantly employed in setting in more letters; the whole being performed with a degree of expedition and address not easy to be imagined.

A line being thus composed, if it end with a word or syllable, and fill the measure, there needs no farther care; otherwise more spaces are to be put between the several words to justify the lines, *i. e.* to make the measure quite full, so that every line may end even; and thus he proceeds to another line.

The spaces here used are a sort of blanks, of the like dimensions as the letters, but less high; and whose faces, therefore, when set, do not appear, nor give any impression. They are of several kinds, according to the dimensions of the whites or intervals to be made by them, *viz.* quadrats, to fill up a break at the end of a paragraph, or the like; m quadrats, which are square, and of the thickness of an m, serving to make the distance after a period, or between sentence and sentence; n quadrats, of the thickness of an n, to be placed after colons, semicolons, and commas; and thick or thin spaces, to be used between the words in justifying, as above.

For marginal notes, in the spaces reserved for them between the two sliding pieces of the composing-stick, are put little quadrated pieces of metal, called *gustations*; which are justified by other smaller pieces; a slip of scaleboard being placed from the top of the page to the bottom, to keep the note and text at due distance.

The first line being thus completely justified, the compositor advances to the next; in order to which, he moves the brass rule from behind the former, and places it before it, and thus composes another line against it, after the same manner as the former: and thus he goes on till his stick be full, which he empties into the galley, after the manner following:

Taking the rule from behind the last line, he places it before it; and with his two middle fingers squeezes the lines in the stick close; his two fore-fingers at the same time being applied on the outside of the rule: thus he lifts them out of the stick, and clapping his two thumbs behind the first line, lifts them into the galley; taking care to disengage his two thumbs without breaking the lines.

The compositor having thus set the proper number of lines in the stick, *viz.* four, five, six, or more, and emptied them out into the galley, he again fills and empties, as before, till a complete page be formed; remembering at the bottom of every page to set a line of quadrats, and at the end of it the first word of the page ensuing, for a catch-word; and if it be the first page of the sheet, one of the letters for a signature.

The galley is a flat wooden tray or dish, in form of a long square; of a length and breadth proportionable to that of the page; it consists of two parts, the upper, called the *slice*, by which the pages of large volumes, when composed, are slid upon the stone; the other, called the *coffin*, which is the body of the galley, is ledged on three sides to contain the slice; the inner ledge not to exceed half an inch in height, that the composed page rising above it by one half the height of the letter, may be tied up, or bound down, and removed without danger. When at work, the

the compositor places this galley at the top of the case, and it is prevented by a wooden pin from sliding down the boxes.

The page, then, being composed, and ranged in the galley, he ties it up in it with a cord or packthread, and sets it by, and proceeds to the next, till the number of pages of the sheet be completed; which done, he carries them to the imposing or correcting stone, there to range them in order in a chafe; which they call *imposing*.

The chafe is a rectangular iron frame of different dimensions, according to the size of the paper to be printed on, having two cross pieces of the same metal, called a *long* and *short cross*, mortised at each end into the frame, so as to be taken out occasionally.

By the different situations of these crosses, the chafe is fitted for different volumes, for quartos and octavos; one traverses the middle lengthwise, the other broadwise, so as to intersect in the centre, which is the most customary situation; for twelves and twenty-fours, the short cross is shifted nearer to one end of the chafe. For folios, the long cross is left entirely out, and the short one placed in the middle; and for broad-sides, or sheets printed on one side only, both crosses are set aside.

To dress the chafe, or range and fix the pages in it, they make use of a set of furniture, consisting of reglets, or slips of wood of different dimensions, and about half an inch high, that they may be lower than the letters; some of these are placed at the top of the pages, called *head-sticks*; others between them to form the inner margin, called *gutter-sticks*; others at the sides, called *side-sticks*; and others at the bottom, called *foot-sticks*.

The pages then being placed in order on the stone, the chafe is put over them, and the reglets applied between the letter and the chafe, in the position above-mentioned; the whole is locked up by means of small pieces of wood, cut in the wedge-form, called *quoins*, which are driven with a mallet and shooting-stick to a sufficient tightness. Before the form be quite locked up, they press down the same, by passing a smooth piece of wood, called the *plainer*, over the letters, to make their surfaces stand flat and even; and, when locked up, they shake it, to see that nothing stir.

In this condition, the work is called a *form*, containing more or fewer pages, according to the volume.

As there are two forms required to every sheet, when both sides are to be printed, it is necessary they be exactly of the same length and breadth; *i. e.* the corresponding reglets, head-sticks, &c. are to be equal in both forms, that the pages may fall exactly on the back one of another; which is called *register*.

Here, then, properly ends the compositor's office; the form, thus finished, being to be committed to the pressman.

Indeed, as it is impossible but there must be mistakes in the work, either through the oversight of the compositor, or by the casual transposition of the letters in the cases; after drawing off a proof, it is delivered to the corrector; who reading it over, and rectifying it by the copy, it is remanded to the former operator, to be corrected accordingly. For the characters used in correcting a sheet for the compositor, see CORRECTION.

The compositor, then, unlocking the form upon the correcting-stone, by knocking out or loosening the quoins, and spreading his corrected proof so as that the lines of it range with the respective ones of the metal, by running his eye along both, he easily spies where corrections are to be made; according to which, he proceeds to pick out the

faulty letters, points, &c. with a sharp-pointed steel bodkin, and puts others in their places.

Where the alterations are considerable, and particularly where insertions or omissions are to be made, there usually arises a necessity of over-running; in order to which, they must decompose, or return the lines back from the chafe into the galley, and from the galley again into the composing-stick, to be new-modelled and rectified accordingly.

If, *e. gr.* one or more words, to be inserted in a line, cannot be gotten in by changing the spaces of the line for lesser ones, part of the line must be put back into the close of the preceding one, or forward into the beginning of the subsequent one, or both, till room is obtained. If the insertion be large, several lines will need to be over-run, either backward or forward, till a break is arrived at; when if it be not gotten in, a line is to be driven out; and, to get in that line, the next pages, either backward or forward, must sometimes be over-run before it can come in.

When an omission is to be made, the contrary course must be taken. If it be but little, the compositor takes it out, and drives out the remaining matter, either by enlarging his spaces, or bestowing the beginning of the following, or the close of the preceding line therein. If it be considerable, he may be obliged to over-run several pages before it can be driven out.

As to the faults which escape the corrector and compositor, they are usually noted in what we call the *errata*. The ancient editions had no errata; but in lieu of it, they corrected the faults in each printed copy with a pen, which was easy enough in those days, though impracticable now. In effect, we have anciently had printers, who did not need an errata of above five articles in a volume of five hundred sheets; and the distinguishing excellence of printing is correctness; and in this respect many of our modern printers deserve much commendation.

Besides the several kinds of letters and characters above-mentioned, used in printing, they have likewise rules for black lines, borders, and head and tail-pieces, accommodated to the several kinds of letters.

The rules for black lines are of brass, and are made exactly of the height of the letter; otherwise they will hinder the neighbouring letters from printing, or will themselves be hindered by them. These the compositor occasionally cuts into proper lengths, as his work requires.

The *borders*, or *flowers*, are a kind of ornaments, in form of long bars, serving for the division of books, chapters, &c. Their depth is proportioned to the letter; and their length adjusted to the page; for being composed of several moveable pieces, it is easy to lengthen or shorten them.

The *head* and *tail-pieces*, cut either in wood, pewter, brass, copper, or silver, are compartments used at the beginnings and endings of books.

The initial letters are sometimes cut in wood, and figured; sometimes cast like the other characters.

For the conveniency of the binding, the printers had early recourse to signatures, *i. e.* letters of the alphabet placed at the bottom of the first page of each sheet, which shew the order they are to be bound in, as well as whether the quires are complete; which method is still continued.

The *catch-words* serve nearly the same purpose: these are the first words of each page, which are inserted at the bottom of the preceding pages. The number of the pages are equally serviceable to the reader and the binder, to guide to references, and to warrant the book duly bound and collated; some printers formerly put them at the bot-

toms of the pages; but custom has now carried it for the tops.

In the infancy of printing, they had likewise a *registrum chartarum* for the convenience of the binders: to draw this, at the end of each volume, they collected the signatures, and the first words of the first four sheets of each alphabet. To abridge it, they afterwards contented themselves to express the signatures, and how often each letter was repeated; but the *registrum* has been now long disused.

Pressman's office, or PRINTING, properly so called. To work off the form thus prepared and corrected by the compositor, there are three things required, paper, ink, and a press.

To fit the paper for use, it is to be first wetted or moistened, by dipping several sheets together in water: these are afterwards laid in a heap over each other; and to make them take the water equally, they are all pressed close down with a weight at top. As to the degree of wetting, it must be according to the quality of the paper, and the size of the letter; small letters, and stiff paper, requiring most wetting.

PRINTING Ink is of two kinds, black and red; the last occasionally used in title-pages, calendars, &c. the first for the body of books. The composition of each, though now reckoned no part of the printer's business, but usually furnished them by other hands, is as follows:

For black ink.—A hundred pounds of nut or linseed oil, being reduced, by boiling, to the consistence of a syrup, are cleansed and purified by throwing into them two pounds of coarse bread, and about a dozen onions. Nut-oil is supposed to be the best, and is accordingly preferred for the black ink, though the darker colour which it acquires from the fire makes it less fit for the red. This oil is boiled in an iron pot, capable of holding at least half as much more, because it swells very much; when it boils it is kept stirring with an iron ladle; and if it does not itself take flame, it is kindled with a piece of lighted paper, or burning wood, in order to increase its consistence and tenacity, and to diminish its greasiness. The oil is suffered to burn for half an hour or more; and the flame being then extinguished by covering the vessel close, the boiling is afterwards continued, with a gentle heat, till the oil appears of a proper consistence; in which state it is called varnish; of which there should be two kinds, one more and another less boiled; or a thicker and thinner, to be used for different purposes, and in different weathers. The oil is said to lose in being boiled into thick varnish from a tenth to an eighth part of its weight; but different oils, and perhaps the same oil in different states, differ in this respect. The design of adding the bread and onions is more effectually to destroy the greasiness; but Dr. Lewis doubts, whether additions of this kind are of much use. They then boil thirty or thirty-five pounds of turpentine apart, till such time as they find, upon its cooling on paper, that it breaks clean, like glass, without pulverizing; for if it pulverize easily, it is a sign it is burnt. The oil and turpentine being thus prepared, the first is gently poured, half cold, into the latter; and the two stirred together with a stick till they be well mixed: after which the boiling is repeated and the composition is set by, to be used occasionally. The turpentine is used in order to give a greater body to the varnish, and to increase its drying quality; and with some artists, litharge has in this intention been a secret. M. le Breton, in the *Encyclopédie*, observes, that when very old oil is used, neither turpentine nor litharge are needful; but that when the oil is new, some turpentine ought to be

employed, because without it, the smearing of the paper, by the spreading or coming off of the ink, cannot be avoided; and he adds, that it is much more eligible to use old oil than to have recourse to this correction of the new: both turpentine and litharge, particularly the last, making the mixture adhere so firmly to the types, that it is scarcely to be got entirely off by the ley, whence the eye of the letter is soon clogged up.

Now to proceed to make ink, they take a quantity of this mixture, and add to it a certain quantity of lamp-black, working it up with a kind of wooden mallet, or brayer, till the whole be incorporated, and reduced into a kind of pulp; which is the ink for use.

Where, note, that its thickness or strength is always to be proportioned to that of the paper, and the warmth of the weather; strong paper, and hot weather, requiring strong ink: and that the strength or weakness of the ink depends on the greater or the less degree of coction of the varnish. According to M. le Breton, two ounces and a half of the lamp-black are sufficient for sixteen ounces of the varnish. Lewis's *Commerce of Arts*, p. 371.

For red ink, they use the same materials as for black, excepting only, that instead of lamp-black, they add a proper quantity of vermilion. Some hold, that by mixing and incorporating the bigness of a nut of fish-glue, or brandy, or the white of an egg, with the ink, the vermilion acquires a greater lustre.

The PRINTING Press is a well contrived machine, and at a very early period of the art was brought to a degree of perfection, which has not admitted of any very material improvements till the present age. Who first invented it we are not informed, but from Mr. Moxon we learn, that it was very greatly improved by William Jansen Blaew, who established a printing-house at Amsterdam, where he printed many books and maps, which he made from the observations of the famous Tycho Brahe, who had for many years employed him as an assistant, and to make his instruments.

Fig. 1. Plate IV. Printing, is a representation of the printing press in perspective. It has two principal parts, each of which is composed of several others: the first is the body of the press, which is a frame containing the screw, and platen, or surface which produces the pressure upon the paper; and the other is the carriage, on which the *form* of types is laid, and has the means of being drawn out of the body of the press, to remove the paper when printed, and to substitute another sheet. For the convenience of changing the paper, the carriage is provided with frames, called the tympan and frisket, which fold upon each other and enclose the sheet between them, and are then again folded down upon the types.

The body of the press consists of two strong posts, *b, b*, placed perpendicular, called the cheeks, which are joined together by four horizontal cross pieces; the upper of these, *a*, is called the cap, and has no office but to retain the two cheeks at their required distances asunder: the next cross piece, *b*, is called the head; it is fitted by tenons at the ends into mortises between the cheeks, and these mortises are filled up with pieces of pasteboard or soft wood, in such a manner as to admit of a small motion or yielding. The head is sustained by two long screw-bolts, which suspend it from the cap: in the head is fixed a brass nut, containing a female screw or worm, which is fastened in the wood by two short bolts to keep it up: the worm is adapted to receive the screw by which the pressure is produced. The third cross piece, *c, c*, called the shelves, or till, is to guide and keep steady a part, *i*, called the hose, in which the spindle of the screw (to be spoken of hereafter) is inclosed. The fourth cross plank, *f, f*, called the winter, is fitted between the cheeks to bear the carriage;

it sustains the effort of the prefs beneath, as the head does above, each giving way a little, the one upwards the other downwards, to make the pull the easier. The spindle, *g g*, is an upright piece of iron, pointed at the lower end with steel, having a male screw formed on its upper end, which enters about four inches into the female screw or worm fixed in the head: through the eye of this spindle is fixed the bar or handle, *b*, by which the pressman works the prefs. The platen *k*, or surface which acts upon the paper to produce the impression, is suspended from the point of the spindle by means of a square block or frame of wood, *i*, called the hofe, which is guided by passing through the shelves *e e*: the lower part of the spindle passes through the hofe, and its point rests upon the platen *k*, being received into the plug fixed in a brass pan supplied with oil, which pan is fixed to an iron plate let into the top of the platen *k*. The pressman then, by pulling the bar *b*, fixed in the eye of the spindle *g*, by an iron key turns the spindle, and by means of its screw presses down the platen upon the *form* of types, which is covered with the paper, tympan, and its blankets, all these parts being brought under the platen by the carriage, when the impression is to be given. That the platen may be suspended from the spindle, and rise up again with it, the hofe, *i*, is attached to the spindle by the *garter*; this is a fillet of iron screwed to the hofe, and entering into a nick or groove formed round the upper part of the spindle; it prevents the hofe falling down on the spindle. At each corner of the lower part of the hofe there is an iron hook fastened, and from these to similar hooks, fastened at each corner of the platen *k*, cords or packthread are looped to suspend the platen, and they are exactly adjusted, to hang the platen truly level.

The carriage *ll*, which is the other principal part of the prefs, is adapted to run into the space between the cheeks under the platen. It is supported upon the ribs *n*, which are part of a horizontal wooden frame, having its fore-part supported by a wooden prop *m*, called the fore-stay, while the other end rests on the winter. On the rails of this frame two long iron bars or ribs are nailed, and under the plank of the carriage are nailed short pieces of iron or steel, called cramp irons, which slide upon the ribs, when the carriage is run in or out, by the following means. Beneath the carriage is placed a small spindle called the spit, with a double wheel formed in the middle of it, round which leather girts are passed and fastened, the opposite ends being nailed to each end of the plank, *l*, of the carriage. On the extreme end of the spit is fixed the handle or rounce *p*, by which the pressman turns the spit, and this, by means of the wheel and straps, runs the carriage in or out at pleasure. The carriage itself consists of a strong wooden plank *l*, upon which a square frame of wood is fixed, to form the coffin or cell, in which a marble or polished stone is inclosed, for the form of the types to be laid upon. To this coffin are fastened leather stay-girts, one to each side, which being at the opposite ends fastened to the cheeks of the prefs, prevent the carriage running too far out, when drawn from under the platen. On the fore-part of the plank is a gallows *rr*, which serves to sustain the tympan, when turned up from off the form, on their hinges. The tympan, *s, s*, are square frames covered with parchment. The frames are made of three slips of very thin wood, and at the top a slip of iron, still thinner, called a head-band. The two tympan are fitted together by the frame of one, being small enough to lie within the other: the outward tympan is fastened with iron hinges to the coffin. Between the two parchments of the tympan two or three thicknesses of blankets are placed, which serve to make the impression of the platen upon the surface of

the letters more equal, as also to prevent the letters from being broken by the force of the prefs. The use of the inner tympan is to confine these blankets. The frisket, *t*, is a square frame of iron, made very thin, also covered with paper or parchment, and fastened to the head-band of the outer tympan by hinges: it folds down upon the tympan, to enclose the sheet of paper between them, the parchment or paper with which the frisket is covered being cut out in the necessary places, that the sheet, when placed between the tympan and frisket, and both together folded down on the form, may receive the ink from the types in the pages; but the frisket sheet keeps the margins clean. The tympan and frisket, when folded down, lie flat upon the form, and the carriage with them is run into the prefs; but when the sheet is to be taken out, the tympan is lifted up upon its hinges, and rests, as represented, in an inclined position against the gallows *r*, before mentioned, at the back part of the carriage; then the frisket, *t*, is lifted up on its hinges, and sustained by a slip of wood, *w*, hanging from the ceiling, whilst it continues open, to take out the printed sheets and put in others.

To regulate the margin, and make the lines and pages answer each other when printed on the opposite side of the sheet, two iron points are fixed to the middle of the wooden sides of the frame of the tympan, which make two holes in the sheet. These holes are placed on the same pins, when the sheet is returned for making an impression on the other side, which is called the *reiteration*, and the pins are adjustable, that they may make the impressions of the opposite sides exactly correspond.

The ink is applied upon the form by balls, which are a kind of wooden cups with handles, the cavities of which are filled with wool, or hair, covered with sheep's skin nailed to the wood. One of these the pressman takes in each hand, and applying them on the ink-block, to charge them with ink, he works them one against the other, to mix and distribute the ink equally; and, at last, smears over the form, by beating or dabbing them several times over the whole face of it; this leaves the form in a condition to be passed under the prefs, with the moistened paper laid on it.

To prepare the prefs for working, the parchment of the outer tympan, against which the sheet is to be laid, is wetted till it is very soft, in order to render the impression more equable; the blankets are then put in, and secured from slipping by the inner tympan. Then, while one pressman is beating the letter with the balls, covered with ink, taken from the ink-block, the other person places a sheet of paper on the tympan, turns down the frisket upon it, to inclose it, keep the margins clean, and prevent it slipping; then folding the tympan down upon the form, and turning the rounce, *p*, with his left hand, he brings the form, with the stone and carriage, (which altogether weighs about 300 lbs. weight,) under the platen; pulls the bar with the right hand, by which means the platen presses the blankets and paper close upon the letter, whereby half the form is printed; then releasing the bar, he advances the form still forward into the prefs, by turning the rounce, and gives a second pull: now letting go the bar, he turns back the form, lifts up the tympan, and opens the frisket, takes out the printed sheet, and lays on a fresh one; and this is repeated, until he has taken off the impression for the full number of sheets the edition is to consist of. One side of the sheet being thus printed, the form for the other is laid upon the prefs, and worked off in the same manner; the sheet being so disposed, that the iron points shall pass through the holes already made in the sheet.

Sometimes it is required to cut the frisket afresh, where

the second side is to be more or less full of printing than the first, as is frequently the case at the beginning and ending of books, half pages at the ends of chapters, &c.

The number of sheets of the edition being complete, the form is to be separated: to restore the letters into the compositors' cases, they first wash it in a strong ley, to take out the remains of the ink, scouring it with a brush, and then with fair water. This done, it is carried to a wooden frame to be unlocked, and the furniture, *i. e.* the sticks and quoins, taken off, to disengage it from the chase. Then the compositor, taking out several lines at once upon a little brass ruler, replaces each letter in its proper box, to be again used in the remainder of the impression; which last operation they call *distribution*.

The operations of the printing press, when conducted by an expert pressman, are performed with a surprising rapidity; but the labour is very great. Two men take it by turns to *pull*, that is, work the press, and *beat*, or ink the types. Whilst one workman is employed in pulling the sheet, his comrade is distributing the ink on his balls, by first applying them to the ink-block, which is a small shelf fixed up against one of the cheeks of the press, and has ink spread out upon it by the slice and *brayer*, which is a wooden muller to mix and grind the ink; then applying the balls together, and turning them round in his hands, whilst the surfaces are rolled or dabbed against each other, the ink becomes equally distributed over them. By this time the pressman having made the pull, and opened the tympan, the other instantly begins the beating, whilst the pressman gets the sheet changed. In beating, he holds a ball in each hand, and applies them upon the types, with the handles in an inclined position; and then he mounts the handles perpendicular, by which means the leather is rolled over the surface of the types, and they are effectually inked; but if they were moved in any other way, the hollows would scrape off the ink, and clog up the letters. Having thus inked a space of as much extent as the two balls will conveniently cover, they are lightly lifted off the letters, and removed to another part, which is inked in the same manner, till the whole sheet is gone over.

The pressman, during the beating, has removed the printed sheet, and laid another evenly upon the tympan, which is done with great address; then folding down the frisket upon it, and shutting both together down upon the form, he runs in the carriage as before-mentioned, to take the first pull; for the platen being only half the size of the sheet, it is printed at twice, and the first time the carriage is run into the press, the pressman knows by a chalk mark previously made on the carriage when the first half of the sheet is under the platen; he now makes his pull, and letting the handle go back, runs the carriage in again, till the other half of the sheet comes under the platen, and then makes a second pull. In this operation he leans his body back, and places his foot against a foot-board beneath the press, to gain a greater purchase. Presses are, in general, adapted for the screw to make a sufficient pressure by a quarter turn of it, but this the pressman can vary to his own inclination, by packing up the head, *b*, of the press with pieces of pasteboard in the mortises, till it yields as much as he requires for a *long pull*; or if he puts blocks of wood to fill up the mortises, it will make a *short pull*, which has much the advantage of the other, in respect to the total exertion it requires; but then the handle being suddenly checked on coming to the pressure, it gives a shock to the whole body, which few men can bear. Strong men will work best with a solid press.

The severe labour of printing, by the ordinary press,

has, for a long time past, rendered it very desirable to obtain an accession of power. Many attempts have been made to produce a press which would print the whole surface of a sheet at a single pull: the first which has come to our knowledge was brought from France many years ago, and was called the *Apollo press*. It was a wooden press of the ordinary construction, except that the platen was composed of an iron plate instead of a wooden plank, and made sufficiently large to print the whole sheet at once: the under surface of it was covered with brass, and made truly flat. The screw, or spindle, instead of being turned by the bar or handle, in the usual manner, was united, by connecting rods, with a long lever, placed at the side of the press, and the man worked it by applying both hands to the lever, to bring it down nearly by the same action as working the lever of a pump; this action, requiring a motion of the whole body, was found intolerably fatiguing, and in consequence they were soon disused, even for printing newspapers, where expedition is a superior consideration to every other.

Among the contrivances we have met with for improved printing presses, the first which has been successful in a long course of practice, was invented many years ago by Mr. Roworth, a printer in London. Instead of the screw he uses a plain vertical spindle, furnished with a bar, hose, &c. just as usual; but the upper part, where the worm is usually cut, is a plain cylindrical spindle, and fits into a socket fitted into the head of the press. Upon the upper end of the spindle, just beneath the head, a short cross arm is fixed, which acts against a circular inclined plane fixed under the head of the press; therefore, by turning the spindle, the cross arm acts against the under side of the circular inclined plane, and causes the spindle to descend in the same manner as the screw, but with this advantage, that the inclined plane is formed with a rapid descent at the time the action first begins; but when the platen has come down to the tympan, and the pressure begun, the plane has a very slight inclination, and therefore a great power to produce the impression; and this power increases as the resistance increases. Still, from the manner in which the platen is first brought down, there is not, on the whole, that corresponding loss of time which takes place in the usual mechanical combinations for producing a great power. A great advantage is also derived in the working of this press, from making the inclined plane and cross arm of hardened steel.

The Stanhope press, which is now becoming general, has this property in a higher degree, and is therefore capable of printing a double surface to the common press, with a very small portion of the power which that required.

A Stanhope press is delineated in *Plate I. Printing*, *figs. 1* and *2* being elevations, and *fig. 3* a plan. *AA* is a massive frame of cast iron, formed in one piece: this is the body of the press, in the upper part of which a nut is fixed for the reception of the screw *b*, and its point operates upon the upper end of a slider *d*, which is fitted into a dovetail groove formed between two vertical bars, *e, e*, of the frame. The slider has the platen, *DD*, firmly attached to the lower end of it; and being accurately fitted between the guides *e, e*, the platen must rise and fall parallel to itself when the screw, *b*, is turned. The weight of the platen and slider are counterbalanced by a heavy weight, *E*, behind the press, which is suspended from a lever *F*, and this acts upon the slider to lift it up, and keep it always bearing against the point of the screw. At *G* are two projecting pieces, cast all in one with the main frame, to support the carriage when the pull is made; to these the rails, *H*, are screwed, and placed truly horizontal for the carriage, *I*, to run upon them, when it is carried under the press to receive

ceive the impression, or drawn out to remove the printed sheet. The carriage is moved by the rounce or handle K, with a spit and leather girts, very similar to the wooden prefs. Upon the spit, or axle of the handle K, a wheel, L, is fixed, and round this leather belts are passed, one extending to the back of the carriage to draw it in, and two others, which pass round the wheel in an opposite direction, to draw it out. By this means, when the handle is turned one way it draws out the carriage, and by reversing the motion it is carried in. There is likewise a check strap, f, from the wheel down to the wooden base, M, of the frame, and this limits the motion of the wheel, and consequently the excursion of the carriage. The principal improvement of earl Stanhope's prefs consists in the manner of giving motion to the screw, b, of it, which is not done simply by a bar or lever attached to the screw, but by a second lever; *e. gr.* the screw, b, has a short lever, g, fixed upon the upper end of it, and this communicates by an iron bar, or link, h, to another lever, i, of rather shorter radius, which is fixed upon the upper end of a second spindle, l, and to this the bar or handle, k, is fixed. Now when the workman pulls this handle, he turns round the spindle l, and by the connection of the rod, h, the screw, b, turns with it, and causes the platen to descend and produce the pressure. But it is not simply this alone, for the power of the lever, k, is transmitted to the screw in a ratio proportioned to the effect required at the different parts of the pull; thus at first, when the pressman takes the bar, k, it lies in a direction parallel to the frame, or across the prefs, and the short lever, i, (being nearly perpendicular thereto,) is also nearly at right angles to the connecting rod b; but the lever, g, of the screw makes a considerable angle with the rod, which therefore acts upon a shorter radius to turn the screw; because the real power exerted by any action upon a lever, is not to be considered as acting with the full length of the lever between its centres, but with the distance in a perpendicular drawn from the line in which the action is applied to the centre of the lever. Therefore, when the pressman first takes the handle, k, the lever, i, acts with its full length upon a shorter length of leverage, g, on the screw, which will consequently be turned more rapidly than if the bar itself was attached to it; but on continuing the pull, the situation of the levers change, that of the screw, g, continually increasing in its acting length, because it comes nearer to a perpendicular with the connecting rod, and at the same time the lever, i, diminishes its acting length, because, by the obliquity of the lever, the rod, h, approaches the centre, and the perpendicular distance diminishes; the bar or handle also comes to a more favourable position for the man to pull, because he draws nearly at right angles to its length. All these causes combined have the best effect in producing an immense pressure, without loss of time; because, in the first instance, the lever acts with an increased motion upon the screw, and brings the platen down very quickly upon the paper, but by that time the levers have assumed such a position as to exert a more powerful action upon each other, and this action continues to increase as the bar is drawn forwards, until the lever, i, and the connecting rod are brought nearly into a straight line, and then the power is immensely great, and capable of producing any requisite pressure which the parts of the prefs will sustain without yielding. The handle is sometimes made to come to rest against a stop, which prevents it moving further, and therefore regulates the degree of pressure given upon the work: but to give the means of increasing or diminishing this pressure for different kinds of work, the stop is made moveable to a small extent.

A better plan is adopted by some makers of the Stanhope prefs, *viz.* to have a screw adjustment at the end of the connecting rod b, by which it can be shortened; it is done by fitting the centre pin which unites it to the lever, g, in a bearing piece, which slides in a groove formed in the rod, and is regulated by the screw. This shortening of the connecting rod produces a greater or less descent of the platen, when the handle is brought to the stop.

The carriage of the prefs in *Plate I.* is represented with wheels, m, m, beneath, to take off the friction of moving upon the ribs, H. These wheels are shewn at *fig. 4*, which is a section of the screw and the platen, with the carriage beneath it; and *fig. 5* is a plan answering to it. *Fig. 6* is a figure of the carriage, inverted, to shew the wheels; their axles, n, are fitted to springs, p, and these are adjustable by means of screws, r, so that the carriage will be borne up to any required height. This is so regulated, that when the carriage is run into the prefs, its lower surface shall bear lightly upon the solid cheeks, G, which are part of the body of the prefs, and these support it when the pressure is applied, the same as the winter of the old prefs: but the wheels by their springs act to bear up great part of the weight of the carriage with the types upon it, and diminish the friction, yet do not destroy the contact of the carriage upon the ribs, because this would not give the carriage that solidity of bearing which is requisite for resisting the pull. This is only at the time when the carriage is run into the prefs, because as it runs out, the ribs on which the wheels run rise higher, and therefore the wheels support the whole weight. The manner in which the wheels run in rebates or recesses in the edges of the ribs, is shewn at *fig. 2*. The carriage is made of cast iron, in the form of a box, with several cross partitions, which are all cast in one piece, and though made of thin metal, are exceedingly strong: the upper surface is made truly flat, by turning it in a lathe. The same of the platen, which is likewise a shallow box: the slider, d, has a plate formed on the lower end of it, which is fixed by four screws upon the top of the platen, and thus they are united. At the four angles of the carriage, pieces of iron, r, (*fig. 5*.) are screwed on, to form bearings for the quoins or wedges which are driven in to fasten the form of types upon it in the true position for printing. The tympan, P, (*fig. 1*.) is attached to the carriage by hinges, with an iron bracket or stop to catch it when it is thrown back: the frisket, R, is joined to the tympan, and when opened out, rests against a frame suspended from the ceiling. The register points are the same as before described in the wooden prefs, and all the operations of working are exactly the same. The iron frame, A, of the press is screwed down upon the wooden base, M, by bolts, which pass through feet, s, projecting from the lower part of the iron frame. Another wooden beam is fixed into the former at right angles, so as to form a cross, which lies upon the floor. The ribs, H, for the carriage to run upon are supported from the wooden base by an iron bracket, T.

The advantages of the iron presses in working are very considerable, both in saving labour and time. The first arises from the beautiful contrivance of the levers, the power of the prefs being almost incalculable at the moment of producing the impression; and this is not attended with a correspondent loss of time, as is the case in all other mechanical powers, because the power is only exerted at the moment of pressure, being before that adapted to bring down the platen as quickly as possible. This great power of the prefs admits of a saving of time, by printing the whole sheet of paper at one pull, the platen being made sufficiently large for that purpose; whereas, in the old prefs, the platen is only half

the size of the sheet. In the Stanhope presses, the whole surface is printed at once, with far less power upon the handle than the old presses, when printing but half the surface. This arises not only from the levers, but from the iron framing of the presses, which will not admit of any yielding, as the wood always does, and indeed is intended to do, the head being often packed up with elastic substances, such as pasteboard, or even cork. In this case much power is lost, for in an elastic press the pressure is gained by screwing or straining the parts up to a certain degree of tension, and the effort to return produces the pressure: now in this case, the handle will make a considerable effort to return, which, though it is in reality giving back to the workman a portion of the power he exerted on the press, is only an additional labour, as it obliges him to bear the strain a longer time than he otherwise would. The iron has very little elasticity, and those who use them find it advantageous to diminish the thickness of the blankets in the tympan to one very thin piece of fine cloth; the lever has then very little tendency to return, and the pull is easy in the extreme, requiring very little more force to move it at the latter, than at the first part: indeed it is so different from the other presses, that when an experienced pressman first tries it, he cannot feel any of that re-action which he has been accustomed to, and will not believe, till he sees the sheet, that he has produced any impression at all; and for many days after he begins to work at an iron press, he by habit throws back all the weight of his body in such a manner, as to bring the handle up to its stop with a concussion that shakes his arm very much; and in consequence most pressmen, after a few hours' work, feel inclined to give up the iron press; but when they have once got into a new habit of standing more upright, and applying only as much force as it requires, the labour of the pull becomes less than that of running the carriage in and out; and men who are accustomed to the iron presses only, would be scarcely able to go through the work of the old presses.

The Stanhope presses have come very much into use, and many people are engaged in making them. The first of these are Messrs. Walker, of Oxford-street, who have the advantage of being assisted by the inventor, earl Stanhope; they have a very good machine for turning the surfaces of the platen and carriage, so as to produce very accurate planes; which is a great advantage, as it permits a much thinner blanket than could otherwise be used.

Mr. De Heine has a patent for a Stanhope press, which answers extremely well: the only material alteration is, that he has substituted a spiral, or curved inclined plane, in place of the screw, which is fixed to the head of the press; and a cross arm properly formed, and fixed on the upper end of the spindle, which stands in place of the screw, acts against the fixed inclined plane. The action is very nearly the same as the screw, except that the surfaces admit of being made of hardened steel, and thus diminish the friction very much. The inventor of this for the common press was, as we have before mentioned, Mr. Roworth, but Mr. De Heine has combined it with the levers and iron frame of the Stanhope press. This Cyclopædia is printed by Stanhope presses.

Mr. Peter Kier, of Camden Town, has made several Stanhope presses of a very good construction, the strength of all the parts being very well proportioned, so that his presses are not more liable to break at one part than another. The slider, *d*, he has made in a very convenient manner, by boring out a cylindrical hole down the centre of the press with a boring machine, and into this a cylinder is accurately fitted, the platen being fixed on the lower end of it. To prevent

it from turning round, a flat side is made to the cylinder, and a bar of iron is screwed across the two cheeks *e, e*, between which the hole is bored, and bears against the flat side of the cylinder. Another improvement is in the spindle *l*, to which the handle is affixed: this has a screw cut upon the lower end of it, which is fitted into a nut, and thus, when it is turned round, the spindle rises and falls a quantity equal to the descent of the screw, *b*, in the same period. By this means, the connecting rod, *b*, always draws in an horizontal direction, whereas, in the other presses, one end remains at the same level, whilst the other descends, in consequence of which the joints wear irregularly. On the whole, Mr. Kier's improvements, though they do not constitute a feature of the invention, contribute much to the accurate performance and durability of the machine.

The form he has adopted for the frame, *A A*, is very judicious; that in our plate is unnecessarily strong, having been made at an early period of the invention, when, from being unacquainted with the full power of the levers, many of the presses were broken by the strain, and some makers then determined to put in such a mass of metal, as to resist the utmost efforts of a man at the handle; but being now better understood, they are made much lighter than in the one in our plate, and sufficiently strong.

Several Stanhope presses, that is, presses having levers to work the screw, have been made in wood by Mr. Brooke, or altered from the old wooden presses; but though this is an improvement upon them, it is greatly inferior to the iron frame, which, for the reasons we have given, has a share in the saving of power.

Mr. Medhurst, of Denmark-street, Soho, has produced a printing press of great merit, from its simplicity, and it has the same advantage, in point of power, as lord Stanhope gains by the compound levers. It is a common press in all its parts, but the platen is made the full size of the sheet, and instead of a screw, a plain spindle is employed: on the lower part of it, just above the bar, a circular plate is fixed, and affords steps for the points of two iron rods, which extend up to the head, and are there supported by their points entering sockets. When the platen is up, these rods stand in an inclined position, although both the ends of them are at the same distance from the centre of the spindle; but when the spindle is turned by the bar, the circular plate, in which the lower points of the iron rods rest, turns round in a circle, and the upper ends remaining stationary, they of course come towards a vertical position, in which motion the spindle and platen are forced to descend, in the same manner as though a screw was employed; but this motion has every advantage of the Stanhope levers, or Mr. Roworth's press, without the friction of either, for the power increases as the resistance increases, and when the rods come nearly parallel to the spindle, or into a vertical position, the power is immensely great. We think a press of this kind, if made of iron, and with the other advantages of lord Stanhope's, would be much simpler, and rather better, because the friction and wear are inconsiderable, if the points of the rods and their sockets are hardened.

We have been shewn a model of a new kind of press invented by Mr. Ruthven of Edinburgh; it differs from others in the following circumstances. The form of types, instead of being situated on a running carriage, is placed upon a stationary platform or tablet, which is provided with the usual apparatus of tympan and frisket, with points, &c. to receive the sheet of paper, and convey it to its proper situation on the face of the types, after they have been inked. The machinery by which the power for the pressure is produced, is situated immediately beneath this tablet, and the

platen or surface which is opposed to the face of the types to press the sheet of paper against them, can be brought over the types, and connected at two opposite sides or ends with the machinery beneath the table. By this machinery it is so forcibly pressed or drawn down upon the paper which lays over the types, as to give the impression, which being thus made, the platen can be disengaged from the machinery, and removed from off the types by a motion of the foot, to take out the paper and introduce a fresh sheet.

The machinery for producing the pressure is a combination of levers, actuated by a crank, or short lever, turned by a winch or handle, to which the pressman applies his left hand, just as he does in the present to the rounce or handle of the spit, the handle being placed in the same situation for that purpose. The levers beneath the table are well contrived to have the best effect in saving time, and producing an immense pressure; for when the pressman first takes the handle, it acts with but little advantage as to power upon the levers, and therefore brings the platen down very quickly upon the tympan. The levers have then assumed positions, in which they exert a more powerful action upon each other; and this action continues to increase until one of the levers and its connecting rod come nearly into a line, when the power is immensely great, and capable of producing any requisite pressure. For fastening the types upon the table, or what the printers call the making register, instead of quoins or wedges being introduced at the angles in the usual manner, screws are fitted through pieces which are fixed to the sides of the table; and between the points of these screws the form of types is held steady upon the table, and may be adjusted.

We have not had an opportunity of trying a large press of this kind, but think it promises so much in saving of power and time, as to deserve a trial by printers. It avoids the moving of the heavy carriages with the form; for the platen need be but a small portion of the weight of the loaded carriage; and further, it is adapted to be moved from off the types sideways, and therefore has a less distance to move than the carriage in the ordinary press. The machinery is well contrived in all its parts, both for performance and stability, and is adapted to be made of iron, that it may have no yielding parts. It is far cheaper than the Stanhope press.

A *PRINTING-HOUSE* is a place destined for printing, and fitted up for that purpose with presses, cases, and other furniture.

The most considerable printing-houses in the world are those of the Louvre and Vatican. The first, begun under Francis I., was carried to its utmost perfection under Lewis XIII., by the care of cardinal Richelieu; and removed into the galleries of the Louvre by Lewis XIV.

The Vatican printing-house, called also the *Apostolical* printing-house, because the pope's bulls, decrees, &c. are printed in it, was begun by Pius IV., and furnished with great magnificence by Sixtus V. See *VATICAN*.

Out of both these printing-houses have come forth very beautiful and splendid editions of the ancient authors. The Vatican was the first that printed books in the Arabic language.

PRINTING, Stereotype, is a method of producing plates from moveable types, by forming a mould with them in plaster of Paris, or any other fit substance, and in this mould casting a metallic plate, which will have the same surface as the types had, and will print the same. Therefore, in this method the moveable types are not used to print from, (except for proofs to correct the errors of composition,) but are employed as a model or pattern to cast the

stereotype plates by which the impression is to be printed. For the history and further particulars of this invention, see *STEREOTYPE*.

PRINTING Machine.—The immense number of books and newspapers which are printed in this country, has rendered it desirable to have machines for printing, which would throw off copies more rapidly, and without requiring such excessive labour as the printing press does. For daily newspapers in London expedition is the grand object, as the whole impression (often as many as 6 or 8000 copies) must be printed between the hours of midnight, and eight or nine o'clock in the morning; and often, when there are important debates in parliament, they are not able to begin printing so soon as midnight.

The first attempts at printing machines were only to employ machinery for actuating a common press, and by the force of horses, or steam-engine, to perform the part of the pressman. We have seen a model of such a machine, which printed very well, and with great rapidity, but was so complicated, that on a large scale it could not have been urged into motion so quickly as the pressman can work; and in effect, when put to trial, it was found to employ one horse instead of one man to work the press. In 1790, Mr. Nicholson took out a patent for a machine to print by cylindrical rollers, the types being so formed with stems smaller at one end than at the other, that, when composed, they would form a cylindrical surface instead of a plane. Between a roller covered with these types, and another plain roller, the paper was to be passed, and thus receive an impression: the ink was distributed by machinery. Mr. Nicholson's machine answered very well for printing patterns upon calico, paper-hangings, or any other papers, where the surface of a solid roller could be engraved to print from; but the moveable types were not found practicable, and therefore the machine was inapplicable to book-printing.

A patent has recently been obtained by Messrs. Bacon and Donkin, for a machine which they publicly exhibited before the university of Cambridge, and they are now making one for printing bibles and prayer-books at the university. We have examined their machine at work, and found it to display so much mechanical ingenuity, and to produce such beautiful specimens of printing, with a rapidity unequalled by any other means, that we have made a drawing of it. (See *Plate III. Printing*.) The invention consists in adapting the types to be fixed upon, and form the surface of, a prismatic roller, such as a square, pentagon, hexagon, octagon, or other figure, and mounting this in a frame, with the means of turning it round upon its centres; a second roller is applied in such a manner, that its surface will keep in contact with the surface of the types which are inked, and the machine being put in motion, the paper which is to be printed is passed through and receives the impression. The types are inked by a cylinder, which is applied to revolve with its surface in contact with them. By this invention, the advantages of types between rollers are obtained, although the types are imposed upon plain surfaces.

Plate III. of Printing, contains a perspective view of a machine, the prism, A, of which is square in its section, and has the ordinary types or letter press applied upon its four sides, and firmly attached to it. The pivots at the end of the axis of this prism are supported in the frame B B, and it is caused to revolve, by a connection of wheelwork, D E and F G, from the winch and fly-wheel at H. The types upon its surface are caused to print upon the paper by means of a second roller, I i, called the platen, placed immediately beneath the former, and its surface being formed

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to a particular curvature, produced by four segments of cylinders, its circumference, when it turns round, will always apply to the surface of the types, and thus a sheet of paper being introduced between them will receive the impression. The ink is applied to the types by means of a cylinder, *K K*, placed above the prism. It is composed of a soft elastic substance; and that its surface may always apply to the types, its spindle is fitted in pieces *L, L*, which moving upon an axis, *n*, permit the cylinder to rise and fall, to accommodate itself to the motion of the types. The ink cylinder receives its ink from a second cylinder, *M M*, which is called the distributing roller, also composed of a soft substance, and is supplied with ink by a third ink roller *N N*, which is made of metal, and extremely true. The ink is lodged in quantity against this roller upon a steel plate, *O O*, the edge of which, being placed at a very small distance from the circumference, permits the roller, as it revolves, to carry down a very thin film of ink upon its surface, and this being taken off by the distributing roller, is applied to the surface of the inking cylinder, which, as before-mentioned, inks the types.

The sheet of paper is introduced, as shewn in the figure, by placing it upon a blanket, which is extended upon a feeding-board *P P*, and drawn into the machine at a proper time, by having a small ruler, *z*, fixed to it. The ends of this are taken forward by two studs, *b*, attached to endless chains, which are extended from the wheels, *e, e*, at the end of the platen, to other wheels, *d, d*, which are supported in the frame of the feeding-board. The wheels, *e, e*, having teeth entering the links of the chains, cause them to traverse when the machine is turned round, and at the proper time the pins, *b*, draw the ruler, *z*, and blanket forward, and introduce the paper into the machine, and by passing between the prism and platen, it is printed as before-mentioned. This is the general action of the machine, and we shall proceed to detail the structure of the several parts. The type is composed, and made up into pages, in the usual manner; the pages are then placed in frames or galleys, *a, a*, and fastened by the screws at the ends, the shape and size of the galleys being adapted to the size of the page it is intended to print. These galleys are attached to the four sides of the central axis of the prism by the screw-clamps *1*, the edges of the galleys being mitred together. By relieving the clamps the galleys can quickly be removed, and others put in their places. The platen, *I i*, is composed of four segments of cylinders, *i i*, which are attached to the different sides of the central axis, *I*, by means of screws, and these segments being proportioned to the prism, will be the true figure for the platen to produce the required motion, so that the surface, when it revolves, will, in all positions, preserve an accurate contact with the surface of the types. The two wheels, *D, E*, which cause the prism and platen to accompany each other, are formed to correspond with the two. Thus the upper wheel, *D*, is a square, with its angles rounded off, and the pitch or geometrical outline is exactly of the same size as the square formed by the surfaces of the types. The lower wheel, *E*, is of the same shape as the platen, and its pitch line the exact size of the surface thereof. These wheels being cut into teeth, as the figure shews, will turn each other round, and make their surfaces at the point of contact exactly correspond in their motions, so as to have no sliding or slipping upon each other. To regulate the pressure upon the paper, the bearings in which the pivots of the platen are supported, can be elevated by screws, *3*, and its surface will press with more force upon the types; but that this may not derange the action of the wheels, *D* and *E*, universal joints are applied in their

axles at *R*. The inking cylinder, *K*, is caused to preserve its proper distance from the centre of the prism by wheels, *S*, fixed upon its axis, and resting upon shapes, *T*, fixed upon the axis of the prism. Each of the shapes, like the wheel *D*, has four flat sides, corresponding in size with the surfaces of the types; the angles are rounded to segments of a circle from the centre: the wheels, *S*, are of the same size as the inking cylinder, therefore, as they rest upon the shapes, *T*, they prevent the ink cylinder pressing upon the types with any more than a sufficient force to communicate the ink without blotting: The inking cylinder is turned round by a cog-wheel, *V*, upon the extremity of the axis of the prism, which is of the same shape as the wheel, *D*, and engages another wheel, *W*, upon the end of the spindle of the inking cylinder: the latter wheel likewise gives motion to the distributing roller by a pinion, *f*, and this again turns the ink roller by a third pinion, *g*, fixed upon the end of its axis, *n*, which is supported upon bearings, *B, B*, in the frame. The pieces, *L, L*, which support the pivots of the distributing roller and inking cylinder, are fitted upon the axis, *n*, of the inking cylinder, so as to rise and fall upon its centre, and the distances of the rollers being thus kept invariably the same, their circumferences are kept accurately in contact, to communicate the ink to each other. The steel plate, *O*, which, as before-mentioned, regulates the quantity of ink that the roller, *N*, shall take round with it, is supported by a piece extended across the fixed frame, *B B*. There are pieces of metal fixed upon this plate by thumb nuts, which prevent the ink flowing off at the ends, and they enter into grooves formed round the ink roller, *N*, near its ends. The machine is put in motion by the handle with the fly-wheel *H*, and this has a small wheel, *G*, turning a large one, *F*, upon the end of the axis *l*.

The frame supporting the feeding-board, *P*, consists of two rails, *X*, fitted upon the axis of the platen, and supported at the opposite ends by a brace from the framing; they sustain the pivots of the wheels, *d, d*, for the chains; *x* are two rulers fixed at each side of the feeding-board, and forming a lodgment for the ends of the ruler *z*, which is attached to the blanket, and it slides upon these when it is advanced by the chains. The spaces on the platen between the segments, *i, i*, are all filled up by pieces of wood, except one, and in this space the ruler is received when it passes through the machine. In the interval when the spaces between the types are passing over the sheet, and therefore leave the margin between the pages of printing, the paper is not held between the rollers; but to prevent it from slipping during this interval, the blanket and paper are pressed down upon the pieces of wood which fill up in the platen between the segments, *i, i*, by the weight of small rollers or wires, *4*, supported by cocks, *5*, projecting from the axis of the prism, and being fitted into the slits at the end of these cocks. The wires are at liberty to rise and fall by their own weight; thus, when they are at the upper part of the revolution, they fall into the spaces at the angle of the prism, between the pages of the types, and thus escape the ink cylinder; but when they are at the lower part of their revolution, they fall upon the paper, and press it with sufficient force upon the pieces of wood in the platen to carry the paper forward at the interval when the types do not act upon it, and of course while the space between the pages of the printing is passing through.

The operation of printing being very delicate, and requiring great accuracy, the machine is provided with many adjustments to make it act correctly, which are as follow: The segments, *i, i*, upon the platen roller are attached to the central axis, *I*, by three screws at each end; the two
middle

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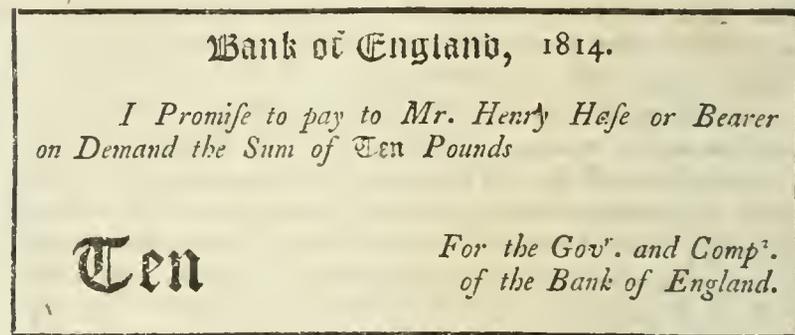
middle ones of these (represented with square heads) draw the segments down upon the central axis, whilst the others (which are turned by a screw driver) bear them off; therefore, by means of these screws, the segments can be accurately adjusted, till they are found by experiment to apply correctly to the types, and make an equal impression on all parts of the sheet. To render the whole impression greater or less, the screws, 3, beneath the bearings of the platen roller are turned as before-mentioned. The degree of pressure with which the ink roller bears upon the types, is regulated by increasing or diminishing the size of the shapes, T, which support its weight. And to render these capable of adjustment, each is composed of four pieces, marked 6, attached by screws, 7, to a central piece, or wheel, which is fixed upon the axis; and as the edges of these pieces form the outline of the shape, they admit of being adjusted by other screws to a greater or less distance from the centre, and of course may be made to bear up the ink cylinder, till the pressure on the types is equal throughout the whole surface, and sufficient to supply the ink properly. The ink cylinder is adjustable as to its pressure against the distributing roller, and for this purpose the bearings, k, which support the cylinder, are fitted upon the pieces, L, to slide, being capable of regulation by means of screws. In a similar manner the distributing roller can be adjusted to a proper distance from the inking cylinder. The plate, o, can be adjusted for the distance from the ink roller, N, by screws, p, fastened by thumb nuts: this regulates the degree of colour the impression will have, by permitting the roller, N, to take more or less ink: behind the inking cylinder, K, a rubber, or scraper, is placed, to press very lightly against the cylinder, and to prevent the ink accumulating, in rings, round the cylinder; it is fitted upon centres, and held up by a lever, which is suspended by a catch, y, at the end of the piece L. This catch is withdrawn when the machine is not at work, and then the scraper falling down upon its centre, does not touch the cylinder. It is necessary that the wheels D and E should be placed upon their axes, in such a position that their curvature will correspond with the curvature of the prism and platen. For this purpose the universal joint, R, is fitted upon the axis, l, of the wheel, with a round part, that it may turn on it. A piece of metal, r, is fixed fast upon the spindle, l, and has a hole in it for the reception of a tooth, s, which is screwed fast upon the universal joint; then two screws being tapped through the sides of the piece, r, press upon the end of s, and by forcing it either way, will adjust the wheel with respect to the platen, till they exactly correspond: another similar adjustment may be applied to the upper axis.

The manner of forming the inking and distributing rollers with an elastic substance, is worthy of particular notice. Leather stuffed in the manner of a cushion was first used, but did not succeed, because it became indented with the types; but after many trials, a composition of glue, mixed with treacle, was found to answer perfectly. The roller is made of a copper tube, covered with canvas, and placed in a mould, which is a cylindrical metal tube, accurately bored, and oiled within: the melted composition is then poured into the space of the mould, and when cold, the whole is drawn out of it, with the glue adhering to the copper tube, and forming an accurate cylinder without any farther trouble. The composition will not harden materially by the exposure to air, nor does it dissolve by the oil contained in the ink. This machine is well adapted to print from stereotype plates, which the universities have adopted for their bibles and prayer-books.

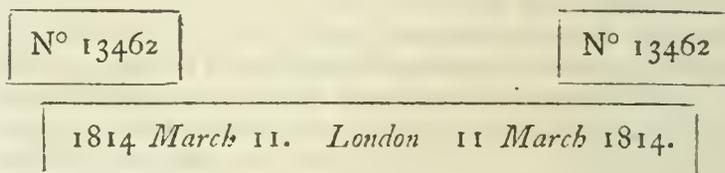
We understand that a printing machine will very soon be

produced by Mr. Bensley, which is the invention of a foreigner, who has taken several patents for it, but we have not yet had an opportunity of seeing one.

Printing Machine for numbering Bank Notes.—This machine is ingenious and curious, from the circumstance, that after every impression which is produced by it, the types are changed by mechanism, so as to produce a different impression the next time. The Bank of England have, within these few years past, adopted this method of filling up the blank spaces which are left in their notes after they have been printed from a copper plate by the rolling-press. These blanks, which are for the number and date of the note, were formerly filled up in writing; for each note being different in these particulars did not admit of being printed, until the present machine was invented by Mr. Joseph Brahmah. The note which is engraved on the copper plate, and printed, is as follows.



Upon these notes the machine is required to print the number twice repeated, which is first to be printed, in large characters, upon the word *I Promise*, in the first line, and again upon the words *or Bearer*, at the end of the same; as, for instance,



London and the date are printed in the blank line which is left after the words, *sum of Ten Pounds*.

The copper plates on which the above is engraven are double, that is, each prints two notes upon one long piece of paper, which being put into the machine, has the blanks printed in the easiest manner imaginable. In the operation of taking out the paper to put in another note, the machine changes the types to the succeeding number: for instance, if one of the notes is printed N° 10 N° 10, and the other upon the same paper, N° 100 N° 100, when the paper is taken out, the types change, without any attention of the operator, to N° 11 N° 11, and N° 101 N° 101, and when these are printed, they change again to the succeeding numbers. The types for the date are cast in stereotype, and are of course changed every day, each machine being furnished with one for every day in the year.

The advantages of this method have been found considerable, in avoiding mistakes of numbering notes erroneously, to which they were before very liable, and in the dispatch of business, its advantages are very great. To fill up 400 notes, with the number and date twice repeated, was considered a sufficient day's labour for each clerk; but by the machines, one man can print 1300 double notes, which are equal to 2600 single ones, or perform more than six times the business which could formerly be done in the same time. The Bank

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Bank of England have more than forty of these machines, one of which we have obtained drawings from ; but to diminish it to the size of a plate, our draughtsman has represented it as if cut in half, or made as a single machine, to print only one note at a time ; those in use at the Bank are therefore to be considered as double the length, and containing a repetition of the types and the machinery for moving them. In *Plate II. Printing, fig. 1.* is a section, and *fig. 2.* a plan, and the same letters refer to both. The whole is framed upon a thick board of mahogany, which is fastened down upon a table : the frame, which is of iron, is screwed to the board at *L*, and forms a square box, in which the mechanism is contained. *KK* is a brass lid, or cover, to the box, through holes in which the types, for printing the numbers, are placed, and their surfaces project a little above the surface of the cover, *K*, so as to produce an impression when the note is pressed down upon them by the power of the hand applied to the lever *D*. This lever moves upon an axis *A*, (*fig. 1.*) which extends across the box, having pivots fitted into sockets, *B*, (*fig. 2.*) projecting up from the frame, as is evident in the figure. From this axis a piece of metal, *C*, extends, and has screws, *l* and *m m*, in it, by which the tablet, or platen, *E*, is attached to it ; and these screws admit of adjusting the tablet, *E*, with respect to the axis, that its under surface may fall perfectly flat upon the types, and print with equal pressure upon all parts of the note. For this purpose four of the screws, *m*, pass through holes in the piece *C*, and screw into the tablet, so as to draw the two together ; whilst the other two screws, *l, l*, screw into the piece *C*, and their points bear upon the upper surface of the tablet, *E* ; it is therefore by the latter that the pressure is transmitted, the others being only for adjustment : the lever *DD* is fastened upon *C* by three screws, marked *n, o, o*. The note is placed upon the under surface of the tablet, *E*, when it is to be printed, its situation being determined by two fine pins fixed in the tablet, which are made to penetrate the paper at two small dots printed upon it by the copper-plate which printed the words of the note, as before-mentioned ; and it is confined in its position against the tablet by the frisket, which is a piece of vellum, *H*, stretched in a brass frame, and is connected by hinges, *a, a*, to the tablet *E* ; it thus folds down, enclosing the note between the tablet and frisket as it were in a book. The vellum of the frisket has openings cut through it at the places where the machine is to print upon the note. As it is necessary that the paper should be pressed upon the types by a yielding substance, the tablet, *E*, has two folds of cloth placed against its surface, and these are secured by a piece of parchment, stretched over a brass frame, which is attached to the tablet by four screws. The note therefore is placed against this parchment when it is to be printed ; and not against the brass of the tablet. Each circle, as shewn in *fig. 6*, has its circumference divided into 11 cogs, and in every cog a space is cut to receive one of the types which are arranged round the cogs, in a series of 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, and a blank ; and as the circles are placed close together, and turn round independent of each other, any combination of figures may be made by them which is less than $N^{\circ} 99,999$, beyond which number the bank-notes have not extended. Each of the circles has a tendency given it to assume the position in which the types are proper for printing ; that is, with their upper surface parallel to the brass plate *K*, by means of a small pin fitted into a hole in the axis *F*, and having a constant pressure outwards by a small spiral spring placed in the hole beneath it. This pin comes to rest in an angular notch made within the

circle, opposite each type, as shewn by the dark shaded parts in *fig. 6*, and each circle is provided with one of these pins. The end of the pin is formed spherical, and well polished, so that when the circle is turned round, it is forced into its hole in the axis *F* ; but when another notch in the circle presents itself, the pin presses out into it, and retains the circle with a moderate force in its proper position, but will not allow it to rest, except when the pin is in the notch. The word London and the dates are cast in stereotype, and are fastened down upon the surface of the cover, *K*, of the box, just beneath the letter *E*, in *fig. 1*. The dates are changed every day ; the catch, by which they are fastened on the plate, being very readily withdrawn ; but when thrown up, holds them sufficiently fast. The types for printing the numbers are moveable, and herein the invention consists ; they are fixed in the circumferences of wheels, or circles, *d, d*, (shewn also at *e, e*, in *fig. 3*, where the types are plainly pointed out by the numerals upon them) ; these circles are ten in number, and are divided into two clusters, one at each end of the spindle, or axis, *F*, upon which they all revolve freely. This axis, when in the machine, as at *F*, (*fig. 1.*) extends across the frame from side to side, and the types fixed in the circles project above the surface of the cover, *K*, passing up through holes made in the same, as is evident from the figure. By this means the types always arrange themselves into a straight line, and also with their surfaces parallel to the surface *KK*, without which they would not print equally upon the paper. From this description, our readers will perceive that the machine has the power of printing any numbers, or series of numbers, containing less than five figures, by turning the circles round one tooth every time after an impression has been taken, so as to bring a succeeding type into action. But the machine is rendered very complete, by the addition of the following mechanism, to give motion to the circles. A catch or click, *b*, is fixed upon the axis, *A*, of the platen, and acts in the teeth of a wheel, *H*, fixed upon an axis, *G*, (see also *fig. 4.*) which is extended across the machine, and the teeth of other similar wheels, *H* and *K*, (*fig. 4.*) enter into the spaces between the types in the circles *d, d*, as seen in *fig. 1*, and thus, when the axis, *G*, is turned round, it communicates a corresponding motion to some of the circles. The click, *b*, is fixed on the axis, *A*, in such a position, that it does not operate upon the teeth of *H*, except when the handle, *D*, is lifted up, or rather thrown back, as far as it will go, which is regulated by pieces screwed upon the axis coming in contact with the stops fixed upon the plate *K* ; and in doing this, the catch, *b*, moves the wheel, *H*, round one tooth, and consequently the wheel *d*, so as to bring up another type.

The operator, in using the machine, first inks the types with a small printer's ball, opens the frisket sheet, *H*, upon its hinges, *a*, and places the note against the tablet, the proper place being determined by the dots and pins before-mentioned. He now shuts up the frisket, and encloses the note between it and the tablet, the frisket sheet having holes cut through it at the places where the note is to be printed. The handle, *D*, is now brought down to give the impression ; but in this, it should be observed, that though the catch, *b*, again meets the tooth of the wheel *H*, it has no effect upon it, being fitted upon a joint, so as to give way in this direction, and it passes by without moving the wheel. The pressure for printing is given in an instant, and the handle, *D*, being then lifted up to remove the note, and place a fresh paper upon the tablet, the catch, *b*, moves the wheel, *H*, one tooth ; and as these engage the teeth of the

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the circles, *d*, they are turned likewise to change the types ready for printing the succeeding numbers.

We have now to explain the order in which the change of the numbers is conducted. The wheels, H and K, (*fig. 4.*) are only intended to operate upon one of the five circles at the same time; but by sliding the axis, G, endways in its bearings, they can be made to act upon any one of the five which is required; and in all cases the distance between the two wheels, H and K, is such, that they will operate upon the same circle of the assemblage, at either end at the same time. The axis, G, can be retained in any required position by a semi-circular clip, which enters into grooves, *e*, (*fig. 4.*) formed round the axis, and there are five of these, corresponding with the different positions of the axis proper for the wheels to act with the several circles. The shifting of the axis is performed by the knobs at the ends of the spindle, G, which come through the sides of the box, the semi-circular clip which retains it being first lifted up, by turning a knob, *k*, which operates upon it. When the printing first begins, the circles, *d*, are turned round by means of a wooden skewer, so that all the blank types are brought up at the same time. The axis, G, is next set, so that its wheels, H and K, are engaged with the right-hand circle of each of the assemblages of five at each end. In this situation, if the handle, D, is moved down, in raising it up again, the catch, *b*, moves the wheels round, and brings up N^o 1 N^o 1 of the types, and a note being printed with this, in lifting up the handle N^o 2 is brought up. Another note is now printed, then N^o 3, and so on, till N^o 9 is printed, and 0 brought up; after which, the handle is brought down twice without printing any note. This brings up the blank space and N^o 1. The axis is now shifted by its knob Q, (*fig. 1.*) to act upon the second circle from the right-hand, and one motion of the handle being made, brings up 0 of the second circle, making 01 °N, which, when printed, (types being always in reverse,) will be N^o 10. The first circle to the right-hand, which before was units, is now become tens, and the second units, which therefore shifts, at every impression, to 11, 12, &c. up to 19; and after printing this the 0 comes up, making 10. The first right-hand circle is then pushed forwards by the printer by a small wooden skewer, and 2 brought up, making 20. In this manner it proceeds, changing the first circle by hand at every ten, the machine altering itself at every unit, till 99 are printed. When 100 is to be printed, the axis, G, is shifted to the third circle, which becomes units, the second, tens, and the first, hundreds. The printing then proceeds as before, the units being advanced by the machine, but the tens and hundreds, as often as they require it, are advanced by hand. At 1000 the axis is shifted to the fourth circle, and the denomination of each is changed by this becoming the unit: three circles must now be moved by hand, as often as they require it. On arriving at 10,000, the fifth circle must be made unit, by shifting the axis to it, and the four first are moved, when necessary, by hand, and in this manner the machine will print up to 99,999, which is 100,000, wanting 1.

PRINTING, *Chinese*. There are three opinions as to the antiquity of the Chinese printing: one fixing it three hundred years before Christ; another nine hundred years after him; and a third carrying it still farther back, and making it coeval with that mighty empire; though, it must be allowed, the last is much the least probable of the three.

The manner of printing we have already hinted to be very different from that which now obtains among the Europeans. It is true, it has some advantage over our's in correctness, and the beauty of the character; but, in other respects, it

comes far short, the single advantage of moveable characters making more than amends for all that is urged against us by some zealous advocates for this oriental printing.

Books are printed in China from wooden planks, or blocks, cut like those used in printing of calico, paper, cards, &c. among us.

These blocks are made of a smooth, firm, close wood, and of the size of the leaf required. On the face-side they glue a paper, upon which some able penman draws out the several letters and characters with a Chinese pen, which is a kind of pencil. This is the principal part of the work, and that on which the success of the rest depends.

When finished, the block is put into the hands of a sculptor, or cutter in wood; who, following the several strokes of the writer with his gravers, and other sharp little instruments, makes them all appear in relief on the wood. When the carving or cutting is finished, they moisten what remains of the paper, and rub it gently off.

The ink they use in printing is the same with the common Chinese ink, with which they also write, and is made of lamp-black, mixed up with other ingredients.

Their press resembles our rolling-press much more than the letter-press.

As to their paper it is inferior to our's: it is made of the inner bark or rind of a kind of rushes, beat up with water into a pulp or paste, and formed in moulds, much like our's. See PAPER.

The advantages of the Chinese printing consist in this, that they are not obliged to take off the whole edition at once, but print their books as they need them; that the blocks are easily retouched, and made to serve afresh, and that there needs no corrector of the press.

Its disadvantages are, that a large room will scarcely hold all the blocks of a moderate volume; that the colour of the ink easily fades; and that the paper is apt to tear, and is subject to worms: whence it is, that so few ancient books are seen in China.

PRINTING, *Rolling-Press*, is employed in taking off prints or impressions from copper-plates engraven or etched.

It differs, as we have before observed, from letter-printing, in that the marks and characters, whose impressions are to be taken, in the former case are indented, or cut inwards; and in the latter are in relief, or stand out.

This art is said to be as ancient as the year 1460, and to owe its origin to Finiguerra, a Florentine goldsmith; who, casting a piece of engraven plate in melted brimstone, found the exact print of the engraving left in the cold brimstone, marked with black licked out of the strokes by the liquid sulphur.

Upon this, he attempted to do the same on silver plates with wet paper, by rolling it smoothly with a roller; and this succeeded.

This novelty tempted Baccio Baldini, a goldsmith of the same city, to attempt the same; which he did with success, engraving several plates of Sandro-Boticello's design, and printing them off in this new way; in which he was followed by Andrew Mantegna, then at Rome.

This knowledge getting into Flanders, Martin of Antwerp, a famous painter, graved abundance of plates of his own invention, and sent several prints into Italy, marked thus, M. C. After him, Albert Durer appeared, and gave the world a vast number of prints both in wood and copper. About this time, one Hugo de Carpi, an Italian painter, found out a way, by means of several pieces of wood, to make prints resemble designs of chiaro-scuro (see CUTTING in Wood); a method revived in our country, some years ago, with much success by Kirkall, and since at Venice by

Jackson, though very imperfectly; and some years after, the invention of etching was discovered, which was soon after made use of by Parmeggiano.

Mr. Walpole observes, that it was not till Raphael had formed Marc Antonio, that engraving placed itself with dignity by the side of painting. See ENGRAVING and ETCHING.

When the art reached England does not certainly appear. Mr. Chambers, on the authority of Mr. Bagford, (see Phil. Trans. N^o 310. p. 2397, or Abr. vol. v. part ii. p. 20.) erroneously said, that it was first brought from Antwerp by Speed, in the reign of James I.; whereas we had it in some degree almost as soon as printing; the printers themselves using small plates for their devices and rebuses. Caxton's Golden Legend, printed in 1413, has in the beginning a group of saints, and many other cuts disposed through the body of the work. The second edition of his Game of Chesse, and Le Morte de Arthur, had also cuts. Wynkyn de Worde, Caxton's successor, prefixed to his title of the Statutes, in the seventh year of Henry VII. or 1491, a plate with the king's arms, crests, &c. a copy of which is given in the Life of Wynkyn, by Mr. Ames, in his Typographical Antiquities, p. 79. The same printer exhibited several books adorned with cuts, some of which are particularly described by his biographer, p. 87, 88, 89, &c.

The subsequent printers continued to ornament their books with wooden cuts. One considerable work, published by John Rastell, called the Pastyme of the People, and Rastell's Chronicle, was distinguished by prints of such uncommon merit for that age, as to have been ascribed to Holbein. Grafton's Chronicle, printed in 1569, contained many heads, as of William the Conqueror, Henry VIII., queen Elizabeth, &c. and many more are recorded by Ames. But though portraits were used in books, Mr. Walpole observes, that he can find no trace of single prints being wrought off in that age. Those which composed part of the collection of Henry VIII. were probably the productions of foreign artists. The first book that appeared with cuts from copper-plates, or at least the first that Mr. Ames had observed, was the Birth of Mankind, otherwise called the Woman's Book, dedicated to queen Catharine, and published by Thomas Raynalde in 1540, with many small copper cuts, without any name. See Ames, ubi supra, p. 35. 46. 60, and 219. Walpole's Catalogue of Engravers, &c. 4to.

The fabric of the rolling-press, and the composition of the ink used in it, with the manner of applying both in the taking off prints, are as follow:

Structure of the Rolling-Press.—This machine, like the common press, may be divided into two parts: the *body* and *carriage*, analogous to those in the other.

The body consists of two cheeks of different dimensions, ordinarily about four feet and a half high, a foot thick, and two and a half apart, joined at top and bottom by cross pieces. The cheeks are placed perpendicularly on a wooden stand or foot, horizontally placed, and sustaining the whole press.

From the foot likewise rise four other perpendicular pieces, joined by other cross or horizontal ones; which may be considered as the carriage of the press, as serving to sustain a smooth, even plank, which is about four feet and a half long, two feet and a half broad, and an inch and a half thick; upon which the engraven plate is to be placed.

Into the cheeks go two wooden cylinders or rollers, about six inches in diameter, borne up at each end by the cheeks, whose ends, which are lessened to about two inches

diameter, and called *trunnions*, turn in the cheeks between two pieces of wood, in form of half-moons, lined with polished iron, to facilitate the motion.

The space in the half moons, left vacant by the trunnion, is filled with paper, pasteboard, &c., that they may be raised and lowered at discretion; so as only to leave the space between them necessary for the carriage of the plank charged with the plate, paper, and blankets.

Lastly, to one of the trunnions of the upper roller is fastened a cross, consisting of two levers, or pieces of wood, traversing each other. The arms of this cross serve in lieu of the handle of the common press; giving a motion to the upper roller, and that to the under one; by which means the plank is protruded, or passed between them.

Preparation of the Ink.—The ink used in rolling-press printing, is a composition of black and oil mixed and boiled together in a due proportion.

The black is a factitious matter, made, as some suppose, of the oil of vine twigs, or, according to others, of the kernels of fruits, such as peaches and apricots, well burnt, with wine lees.

This black is usually brought hither ready prepared from Frankfort on the Maine; whence our printers call it Frankfort black.

This is softer and more free from grittiness than the ivory or other charcoal blacks, as they are usually prepared among us.

The oil with which they dilute this black is nut-oil; which is set on fire, boiled up differently, according to the different works it is to be used in; but never so far as to communicate to the oil the adhesive gluey quality of the printer's varnish.

They usually make three kinds, thin, thick, and strong, only differing in the degree of coction; the strong is that used in the finest works, &c.

To make the ink, they pulverize the black very carefully, and pass it through a fine sieve; then mix it up on a marble with the proper oil, by means of a mullet, after the same manner as the painters do their colours.

PRINTING from Copper-plates, Method of.—The ink being prepared, they take a little quantity of it on a rubber, made of linen rags, strongly bound about each other; and with it smear the whole face of the plate, as it lies on a grate, over a charcoal-fire.

The plate sufficiently inked, they first wipe it coarsely over with a foul rag, then with the palm of the left hand, then with that of the right; and to dry the hand, and forward the wiping, rub it from time to time on whiting. In wiping the plate perfectly clean, yet without taking the ink out of the engraving, consists a great part of the address of the workman. The French printers use no whiting, as being detrimental to the colour of the ink; nor do they lay the plate on the grate to warm, till after inking and wiping it.

The plate, thus prepared, is laid on a thick paper, fitted upon the plank of the press; over the plate is laid the paper, first moistened, to receive the impression; and over the paper two or three folds of blanketing, or other stuff.

Thus disposed, the arms of the cross are pulled, and, by this means, the plate, with its furniture, passed through between the rollers; which, pinching very strongly, yet equably, presses the moistened paper into the strokes of the engraving, whence it licks out the ink.

Some works require being passed twice through the press, others only once, according as the graving is more or less deep, or the greater or less degree of blackness the print is desired to have.

It must be observed, that the stronger and thicker the ink is, the stronger must the rollers pinch the plate; this tempts many of the workmen to use a thinner oil, in order to save labour; which proves very prejudicial to the impression.

The wetting of the paper ought to be done two or three days before printing it, to render it more supple and mellow: as the prints are drawn off, they are hung up to dry on lines, &c.

Lastly, after the number of prints desired have been wrought off from the plate, they rub it over with oil of olives, to prevent its rusting, and set it by against a new impression. If the strokes of the graving be perceived full of ink hardened therein in the course of the printing, they boil it well in ley before the oil be applied.

PRINTING *with wooden prints.* See CUTTING *in Wood.*

PRINTING *in chiaro-scuro*, is a method of producing a strong effect of relief, attended with a just and natural gradation of the lights and shades, grounded with brown, with white and black, by printing on paper. We have already observed, that the art of doing this in wood was discovered in Italy, by Hugo de Carpi. M. le Bosse directs it to be performed in the following manner. Having provided two copper-plates of equal size, and exactly fitted to each other, on one of them let the proposed design be engraved, and let the prints be taken off from it with printing ink on sheets of grey paper. The other plate must then be varnished, and the varnished side being laid upon the sheet printed by the first plate, they must be passed under the roller; when the print will have made a counter-proof on the varnish of the plate; after which the lights must be graved on the plate, and corroded very deeply by aquafortis. The same thing may otherwise be done with the graver, and with greater ease by those who can use it well. In order to properly prepare the oil, the best method is to use very white nut-oil drawn without fire, and to put it into two leaden vessels, and set it in the sun till it becomes thick in the proportion of the weak oil. Flake white must then be taken, which must be ground, and washed over, till it be extremely fine; and then being dry, it must be ground with the weak oil, and the thick oil added to it. Then having taken an impression with black printing ink, or any other colour, from the first plate, that is entirely engraved, on coarse grey paper, it must be left to dry for ten or twelve days; when these prints having been wet, another impression must be made upon them by the plate, on which the lights are engraved, charged with the white flake and oil in the usual manner of printing; taking care that the correspondent parts of the plate, and the impression already made, may be adapted exactly. By this means the printing in chiaro-scuro is perfectly performed. See CLAIR *Obscure.*

PRINTING *with a variety of colours to imitate painting.* See MEZZOTINTO.

PRINTS, PROPERTV OF. See LITERARY *Property*, and ENGRAVER.

PRINTZ, WOLFFGAN GASPAR, in *Biography*, a practical, theoretical, and historical musician of Germany, whose writings and memory are much respected by his countrymen. He was born in 1641, at Waldthuen, a small city in the Upper Palatinate, on the frontiers of Bohemia, where his father was a principal magistrate, and a receiver of the public revenues; but on account of his religion he quitted that station, and removed to Vavenstraces, a small town in the territory of Furstenberg. The young Printz, having discovered an inclination for music, was committed to the care of several able masters successively, of whom he learned

to play on several different instruments, and studied composition till 1659; after which he went to the university of Altdorf, where he continued till the year 1661, when he seems to have made good use of his time, as his reading and classical knowledge appear considerable.

He had several small appointments in different parts of Germany, as canter, and music director; but none very considerable. However, while he filled these offices, he produced 21 different works upon music; but the most important, and that which now is only sought, is his *History of Vocal and Instrumental Music; historisch Beschreibung der edelen Sing- und Kling-kunst*, Dresden, in 4to. 1690.

The book is now become so scarce, that we have never been able by our own diligence, or that of our friends, to procure a copy of it; and all we know of its contents has been derived from Walther, and Marburg's extracts and account of it in his *Musical Essays*, vol. i. p. 104; by which, however, it appears, that his plan and arrangement were good, and the authors he had consulted the best on the subject. The work seems never to have been finished, as it consisted but of two hundred and twenty-three pages, and M. Marburg's extracts advance no farther in the narrative than Tuifco and Bardus, kings of the ancient Germans and Gauls, who founded the orders of druids and bards.

Printz was not only an historian, musical composer, and critic, but a satirist. His work entitled, *Der Satyrische Componist; the Satirical Composer*, which we have seen, and of which there are five parts, seems to have been produced "in Rabelais easy chair." This work is written with considerable wit and humour. The jests indeed are not of the most delicate and refined sort, though extremely queer and risible.

PRINTZENDORF, in *Geography*, a town of Austria; three miles N.N.W. of Zisterdorff.

PRINTZERDORFF, a town of Austria; four miles W. of St. Polten.

PRIOLA, a town of Italy, in Friuli; 12 miles N.W. of Gemona.

PRIOLO, or PRIOLI, BENJAMIN, in *Biography*, a writer of French history, was born at St. Jean d'Angely, in 1602, of a family descended from Prioli, or Priuli, of Venice. He was educated in the reformed religion, and displayed from a very early period a great avidity for learning. He lost both his parents at the age of 15, and having pursued his introductory studies in his own country, he went to Leyden, where he perfected himself in classical literature under Heinius and Vossius. The desire of consulting Grotius induced him to visit Paris, after which he studied philosophy at Padua, under Cremonini and Liceto. He then attached himself to the duke of Rohan, who was at that time in the service of Venice, and became the intimate confidant of that nobleman, who sent him twice into Spain as his negotiator. He afterwards fought in several actions under his banners. At the death of the duke he retired to Geneva, and married a lady of noble family. He was called from his retreat by the duke de Longueville, when appointed plenipotentiary for the peace of Munster. Here he resided a year, then returned to France, and was converted to the Catholic faith. In the ensuing troubles in France, he took part with the prince of Condé against the court, and was in consequence obliged to retire into Flanders, his property being confiscated, and his family exiled. When he was restored to favour he returned to Paris, and employed himself in composing the history which has preserved his name. This is entitled "Benjamini Prioli ab Excessu Ludovici XIII. de Rebus Gallicis Historicis, Lib. xii." It was first printed at Paris in 1665, but the best edition is that of Leipsic, in 1686. A dedication

dedication is prefixed, addressed to the doge and senate of Venice, as a token of gratitude for their recognizing him as a noble Venetian, and creating him chevalier of St. Mark. The style of this history is copied from that of Tacitus, and it abounds in characters and portraits, often touched in a satirical manner, but the narrative is said to be a free and faithful relation of the war of the Fronde, and the administration of cardinal Mazarin. Prioli died in 1667. Various works were announced at the close of his history as about to be published, but they never made their appearance. Moreri. Bayle.

PRIONUS, in *Entomology*. See CERAMBYX.

PRIOR, MATTHEW, in *Biography*, a distinguished English poet, was born in 1664, according to one account, in London, where his father was a citizen and joiner, but according to another, at Wimborne, in Dorsetshire. His father dying while he was young, he was brought up by an uncle, a vintner, who sent him to Westminster school, then under the direction of the famous Busby. His uncle took him from school before he had passed a regular course, with an intention of bringing him up to his own business; but he had already imbibed a taste for classical literature, and was unfitted for trade. The earl of Dorset, at that time a patron of letters, who frequented his uncle's tavern, found him reading Horace, and on conversing with him, was so much pleased with the modesty and talents which he displayed, that he determined to give him an university education. He was admitted of St. John's college, Cambridge, in 1682, and was elected to a fellowship in 1686. Here he contracted an intimacy with Charles Montague, afterwards earl of Halifax, in partnership with whom he composed the "Country Mouse and City Mouse," which was a parody of Dryden's poem of the "Hind and Panther," and consequently was a declaration of their attachment to the principles which soon after effected the revolution. His next poetic piece was an "Ode on the Deity," written in 1688, as a college exercise. In the following year he went to London, and was introduced at court by the earl of Dorset, who recommended him so effectually, that in 1690 he was appointed secretary to the English plenipotentiaries who attended at the congress at the Hague. He was now completely in the service of the court, and the efforts of his muse were for some years chiefly directed to public or courtly topics. In 1697 Prior was nominated secretary to the commissioners for the treaty of Ryswick, and after his return from that employment, was made secretary to the lord lieutenant of Ireland. He went to France in the following year as secretary to the ambassador, the earl of Portland, and remained in that employment under the earl of Jersey. After this he was appointed under-secretary of state; and was sent to Paris to assist the ambassador in negotiating the partition treaty. In 1700 he succeeded the great Locke as a commissioner at the board of trade, and he sat in the parliament as representative of East-Grinstead. The Tories were now become the prevalent party, and Prior forsook his friends the Whigs, by whom he had been brought into life, and promoted; and joined their opponents, to whom he ever after adhered. He even voted for the impeachment of those lords who were charged with advising that partition treaty, in which he had been officially engaged. Like most converts, he embraced his new party with great zeal, and thenceforward almost all his social connections were confined within its limits. Prior now celebrated the victories of Blenheim and Ramilies, and about the same time he published a volume of poems, of which the concluding piece was his admired "Henry and Emma." In the year 1711 he was sent to Paris in a diplomatic character, with pro-

posals for peace. The congress of Utrecht followed, and in August 1712 he was with lord Bolingbroke at Paris, who was sent there to adjust some difficulties that had occurred. Prior remained in France with the authority and appointment of an ambassador, though without the title, for the duke of Shrewsbury, who went in that capacity, refused to be joined in the same commission with a man so meanly born. Talents, however, are not always allied to high birth, and Prior possessed the confidence of the French court, and was entrusted by Lewis with a special letter to queen Anne, in favour of the elector of Bavaria. After the departure of the duke, in 1713, he publicly assumed the character of ambassador, which he retained till he was superseded by the earl of Stair, on the accession of George I. It was some time before he received remittances from the treasury, enabling him to return; and soon after his arrival in 1715, the Whigs being now in power, he was committed to the custody of a messenger. He was examined closely with respect to his share in negotiating the peace of Utrecht, and Mr. Walpole moved an impeachment of him on a charge of high treason, for holding clandestine conferences with the French plenipotentiary; and when an act of Grace was passed, he was excepted, and treated with a considerable degree of rigour. At length, however, he was discharged without being brought to trial. Hitherto Prior had been chiefly considered as a politician; and though some persons have expressed contempt of his political talents, yet that they were regarded in a respectable light by the heads of both parties is evident from the situations which he held, and there can be no doubt that he possessed the faculty of rendering himself acceptable to the courts to which he was sent. Prior was now reduced to a private station without any provision for his declining years, except his fellowship at the college, which he prudently retained during his highest employments, as what would furnish him with necessaries should every thing else fail. He now completed his longest poetical piece, entitled "Solomon," which, with some other pieces, supplied matter for a folio volume, published by subscription at two guineas. By the efforts of his friends a considerable sum of money was thus raised. He continued occasionally to amuse himself with writing verses; but had reserved for the serious employment of his advanced years, the composition of a history of his own times. The design was, however, cut short by a lingering illness, which put an end to his life in September 1721, in the 58th year of his age. He was interred in Westminster Abbey, under a monument, for the erection of which he left, by will, 500*l*. On the monument is a long Latin epitaph drawn up by Dr. Freind, the master of Westminster school.

"Prior," says one of his biographers, "appears to have been one of those characters whom wit, ease, and companionable qualities, render general favourites, without any exact estimate of moral desert. His dereliction of his first political friends might be atoned for by his steadfast attachment to the second, especially to the earl of Orford, whom he sheltered, on his examination, with a constancy that was probably the cause of the severity with which he himself was treated. His modes of life appear to have been irregular, and notwithstanding his introduction to the highest and most cultivated society, he is said to have retained a taste for low company and gross enjoyments." As a poet his reputation has a good deal declined with the lapse of years, yet in one point, the faculty of telling a story with ease and vivacity, he has, perhaps, scarcely been equalled. His songs and amatory pieces are generally elegant and classical. The most popular of his serious compositions is "Henry and Emma,"

or the Nut-brown Maid. A complete edition of his poems was given in 1733, in three vols. 8vo. Biog. Brit. Johnson's Lives of the Poets.

PRIOR, *before*, something that is nearer the beginning, than another with which it is compared.

PRIOR is particularly used for a superior of a convent of monks, or the second person after the abbot.

Priors are either *claustral* or *conventual*.

PRIORS, *Conventual*, are the same as abbots, all the difference between them being in name; both having the same rights, and both alike being governors of monasteries.

These are of two kinds; *viz.* *regular conventual* priors, who govern religious living in the community; and *secular* or *commendatory conventual* priors.

Conventual priors are obliged to take up the priesthood within a year, or at most two, from the dates of their provision: in default of which, their benefices are declared vacant.

Priors must be twenty-five years old before they can govern the convent; and twenty, if the convent be governed by another. See CONVENTUAL.

Some of these abbots and priors were so considerable, that they were called to parliament, and had seats and votes in the house of lords.

Mr. Fuller says, that in the 49 Hen. III. 64 abbots and 36 priors were called to parliament. But this number being too great, king Edward I. reduced it to 25 abbots and two priors, to whom were afterwards added two abbots; so that there were 29 in all, and no more, that stately and constantly enjoyed this privilege, among whom was the prior of St. John's of Jerusalem, who was stiled the first baron of England, but it was with respect to the lay barons only, for he was the last of the spiritual ones.

PRIOR, *Claustral*, is he who governs the religious of an abbey, or priory, *in commendam*; so called, because he has superiority in the cloister or monastery.

His jurisdiction is wholly from the abbot, and ends with the abbot's death, unless he has been elected by the whole convent.

PRIOR, *Grand*, is the superior of a large abbey, where several superiors are required; as in the abbeys of Cluney and Feschamp.

In the monastery of St. Deny's, there were anciently five priors; the first of whom was called the *grand-prior*. In most monasteries, there is also a *sub-prior*. There are also grand-priors in the military orders; as in that of Malta, or St. John of Jerusalem, &c.

PRIORS *Aliens* were certain religious, born in France and Normandy, superiors of religious houses erected for their country-folks here in England.

These Henry V. deeming no good members for this land suppressed; and their livings were afterwards given by Henry VI. to other monasteries and houses of learning; but chiefly, as Stow observes, to the erecting of those two famous colleges, called the *King's colleges of Cambridge and Eton*.

PRIOR, *Arch*. See ARCH-prior.

PRIOR *Medii*,
PRIOR *Indicis*,
PRIOR *Annularis*,
PRIOR *Auricularis*, } Four of the interossei muscles of the hand. The first belongs to the external, and the three last to the internal interossei. See INTEROSSEI.

PRIORAU, in *Geography*, a town of Saxony; five miles N. of Bitterfeld.

PRIORITES, in *Botany*, a name given by the ancient Greeks to a plant which they recommended in medicine; but they do not clearly explain what it was. It is the same with the *cestrum* and *psuchrotrophon* of the same writers;

and they say it was called *betonica*, *ferratula*, or *rosmarinus*, by the Romans.

It is evident, from a strict enquiry into their accounts, that the *ferratula* was the plant they meant; for Pliny says, that the *betonica* was only a Gaulish name for this plant, and the place of growth, which is described to be wet shady places, evidently excludes what we call *rosemary* from any title to the name.

Apuleius has greatly perplexed the cause, by saying that the *priorites*, or *betony*, has leaves like the docks; but he does not distinguish between the *betonica* and *britannica*, which last plant is the *hydrolapathum*, or great water-dock, and has leaves like the other docks; and it is plain, that both Apuleius and Pliny borrow the account of the dock-like leaves from this passage, and attribute them to a plant the original author never meant them for.

PRIORITY, PRIORITAS, the relation of something, considered as it is *before*, or *prior* to, another; *i. e.* as it is nearer to the beginning, or the first.

The principal modes of priority are five; *viz.* in respect of *time*; as when we say, that the Grecian empire was prior to the Roman; *nature*, as when we say, one is prior to two; *order*, *dignity*, and *causality*; which are all summed up in the technical distich:

“Tempore, natura, prius ordine, die et honore;
Effecto causam dicimus esse prius.”

PRIORITY, in *Law*, denotes an antiquity of tenure, in comparison of another less ancient.

PRIORITY, *To hold by*, is to hold of one lord more anciently than of another; in respect of which the tenant is said to *hold in posterity*. The lord of the priority shall have the custody of the body.

PRIORITY of *Debts*, in *Law*. See DEBT.

PRIORY denotes a society of religious, the superior of which was denominated a prior, or prioress; and of these there were two sorts; as where the prior was chief governor, as fully as any abbot in his abbey, and was chosen by the convent; such were the cathedral priors, and most of the Austin order, and where the priory was a cell, subordinate to some great abbey; and the prior was placed and displaced at the will of the abbot. There were also priories alien. See ALIEN Priories, and PRIORS *Aliens*.

PRISAGE, PRISAGIUM, that share which belongs to the king, or admiral, out of such merchandises as are taken at sea as lawful prize. See PRISE.

PRISAGE of *Wines*, a custom in certain ports, by which the king challenges out of every vessel laden with wine, containing twenty tons, or upwards, two tons of wine; the one before, the other behind the mast; which, by charter of Edward I., was exchanged into a duty of 2*l.* for every ton imported by merchant strangers.

The custom varies a little in various places: at Boston, *e. gr.* every bark, laden with ten tons of wine, pays prisage.

The term is now grown into disuse; and in lieu of prisage, the custom, says Cowel, is popularly called *butlerage*; because it is the king's chief butler that receives it.

PRISCA, in *Geography*, a town of European Turkey, in Albania; 12 miles N. of Albasano.

PRISCIANUS, in *Biography*, an eminent grammarian, was a native of Cæsarea, and went to Constantinople, where he taught grammar and rhetoric with much success about the year 525. He composed various works, of which his treatise “*De Arte Grammatica*” was first published by Aldus Manutius, at Venice, in 1476, from a MS. found in France. It has been reprinted frequently, but the best edition

tion is said to be that of Patfchius, 1605, among the Grammatici Latini. A translation of Dionysius' Periegesis into Latin verse is attributed to Priscian, and has been printed with the Oxford edition of that author. The grammatical fame of this author may be justly inferred from the proverbial phrase of "breaking Priscian's head," applied to a violation of grammar.

PRISCILLIANISTS, PRISCILLIANISTÆ, in *Ecclesiastical History*, ancient heretics, who arose in Spain, or rather were derived thither from Egypt, towards the end of the fourth century.

The origin of this heresy is not well known; but it appears to have been brought into Spain by one Marcus of Memphis, who had for his disciple the rhetor Helpidius, under whom Priscillian was educated.

What their particular tenets were, it is not easy to discover; but they are charged by their adversaries with indulging all kinds of secret filthiness, and nocturnal mixtures, under a religious notion. Among their dogmata, this is said to have been one: "Jura, perjura, secretum prodere noli."

It appears, however, from authentic records, that the difference between their doctrine, and that of the Manicheans, was not very considerable; for they denied the reality of Christ's birth and incarnation; maintained, that the visible universe was not the production of the Supreme Deity, but of some demon or malignant principle; adopted the doctrine of æons, or emanations from the divine nature; considered human bodies as prisons, formed by the author of all evil to enslave celestial minds; condemned marriage, and disbelieved the resurrection of the body. Their rule of life and manners was rigid and severe; and the accounts which many have given of their lasciviousness and intemperance deserve not the least credit, as they are totally destitute of evidence and authority. That the Priscillianists were guilty of dissimulation upon some occasions, and deceived their adversaries by cunning stratagems, is true; but that they held it as a maxim, that lying and perjury were lawful, is a most notorious falsehood, without even the least shadow of probability, however commonly this odious doctrine has been laid to their charge.

Priscillian, their leader, was a man of great birth, fortune, parts, and learning: he was condemned, with some bishops his adherents, in a council at Saragossa, in the year 380, and in another at Bourdeaux in 384; but he appealed to the emperor Maximus, and had a hearing at Treves; where being convicted of broaching novelties, he was condemned to death, with several of his followers. His doctrine, however, survived him, and was propagated through the greatest part of Spain and Gaul. Mosheim's *Eccl. Hist.* vol. i. 8vo. edit.

PRISE, or PRIZE, in *Navigation*, a vessel taken at sea from the enemies of the state, or from pirates, by a man of war, or a merchant-vessel having commission from the admiral.

Vessels are looked on as a lawful prize, if they fight under any other standard than that of the state from which they have their commission: if they have no charter-party, invoice, or bill of lading, aboard them; if they be laden with effects belonging to the king's enemies, or with contraband goods.

Those of the king's subjects, recovered from the enemy, after having remained twenty-four hours in their hands, are also deemed lawful prize.

Vessels, that refuse to strike their sails, after having been summoned thereto by the king's ships, may be constrained

to do it; and, if they make resistance, and fight, they are lawful prize.

The officers and seamen of the king's ships, and of other British ships having letters of marque, are intitled to the sole interest, and property of all ships and goods by them taken, and adjudged lawful prizes by the court of admiralty.

The prize is to be divided among the officers and seamen of the king's ships, as he shall appoint by proclamation. Among privateers, the division is according to the agreement between the owners.

The court of admiralty is to finish the examination of the persons to be examined to prove the lawfulness of the prize, in five days after request for that purpose made. The monition is to be executed in three days. And in case no claim of the capture be duly entered, giving twenty days notice after the execution of the monition; or if there be a claim, and the claimant does not give sufficient security to pay double costs to the captors, if the prize be adjudged lawful, then the court is to proceed to sentence in ten days.

In case of doubt, or of witnesses being remote, the court may release the prize, on the claimant's giving good security to the captors for the payment of the full appraised value, in case the prize be adjudged lawful.

Judges and officers, on failure of their duty, in respect to the condemnation of prizes, forfeit 500*l.* with full costs of suit; one moiety to the king, and the other to the informer.

The judges and officers of the court of admiralty in the king's plantations or dominions abroad, shall not receive above 10*l.* in case the prize be under a hundred tons burthen; nor above 15*l.* if it be of greater burthen.

Commissioners of appeals in causes of prizes are to be appointed under the great seal; and appeals may be made to them within fourteen days after sentence.

Agents for prizes are to be chosen by the captors.

The treasurer of the navy is to pay to the officers and seamen on board ships of war, or privateers, in any action where any ship of war, or privateer, shall have been taken from the enemy or destroyed, 5*l.* for every man on board such prize or ship destroyed, at the beginning of the engagement.

The captures of flota ships, or galleons, or register ships bound from Buenos Ayres, or Honduras, can be tried only in the high court of admiralty.

The statute enacts several penalties and forfeitures for taking prizes by collusion. Privateers forfeit the prize, half to the king, and half to the informer; and the commander of a man of war forfeits 1000*l.* to be divided between the king and the informer.

Also, if any ships belonging to the English be taken by the enemy, and afterwards retaken by any of our men of war, or privateers, they are to be restored to the owners, on paying an eighth part of the value, in lieu of salvage, after having been in the enemy's possession twenty-four hours; and if above that time, paying a farther moiety, &c. 13 Geo. II. cap. 4. 30 Geo. II. cap. 18.

The regulations with regard to prizes in the royal navy, are as follow: 1. When any ship or vessel is taken from the enemy, the hatches are to be immediately spiked up, and her lading and furniture secured from embezzlement, till sentence is passed upon her in some court of admiralty, empowered to take cognizance of causes of that nature. 2. The captain is to cause the officers of the prize to be examined; three or more of the company, who can give best evidence, to be brought to the said court of admiralty, together with the charter-parties, bills of lading, and other ship's

ship's papers, found on board. The 3d and 4th articles relate to finding any of the king's subjects in the prizes. 5. When a privateer is taken, great care is to be had to secure all the ship's papers, especially the commission; but if there be no legal commission found on board, then all the prisoners are to be carried before some magistrate, in order to their being examined and condemned as pirates. See articles 7, 8, and 9, for the government of the navy.

The captor acquires an insurable interest in a prize regularly taken in war. From the moment that the victor hoists his flag on board a conquered ship, he has acquired a qualified property in her which he may insure. For though the king is, in contemplation of law, the captor, and the property of every prize immediately vests in him; yet the practice of bestowing all prizes taken from the enemy upon the officers and men, who are the persons immediately concerned in the capture, is so constant and uniform, that the law will consider the expectation, founded upon this practice, as equivalent to a vested interest. It is also held, that a consignee, trustee, or an agent for prizes, may insure.

PRIZE, in our *Statutes*, is used for things taken of the subjects by the king's purveyors.

Spelman describes prizes to be corn and other provisions taken from the country-people, at lower rates than ordinary, for the maintenance of the king's household, garrisons, &c.

Roger de Monte Alto, who married the sister of Hugo de Albeney, claimed the following privileges; *viz.* his castle of Resigne *cum* prisus 40 *dierum*, with prizes of forty days: which phrase the same author understands of the liberty of taking provisions for the support of the garrison of his castle, upon paying for them within forty days. See stat. 12 Car. II. cap. 34.

PRISM, PRISMA, thus called from *πρισμα*, something *sawn*, or *cut off*, in *Geometry*, an oblong or solid body, contained under more than four planes, and whose bases are equal, parallel, and alike situated.

The prism is generated by the motion of a rectilinear figure, as ACB (*Plate XI. Geometry, fig. 12.*), descending always parallel to itself, along the right line AE.

If the describer be a triangle, the body is said to be a *triangular prism*; if square, a *quadrangular one*, &c.

From the genesis of the prism, it is evident it has two equal and opposite bases; that it is terminated by as many parallelograms as the base consists of sides; and that all the sections of a prism parallel to its base are equal.

Every triangular prism may be divided into three equal pyramids.

PRISM, *to measure the surface and solidity of a.* Find the area of the base, *e. gr.* ABC (*see TRIANGLE*), and multiply it by 2; find the areas of the planes or parallelograms, that include or circumscribe it; and add their sum to the former product. The sum is the whole surface of the prism.

Multiply then the base ABC by the altitude CD; the product is the solidity of the cube ABCDEF. (*See CENTROBARYC.*) Or, for a right prism, multiply the perimeter of the end by the height, and the product will be the sum of the sides, or upright surface. If the ends of the prisms be regular plane figures, multiply the perimeter of the end by the sum of the height of the prism and the radius of the circle inscribed in the end, and the product will be the whole surface.

It is evident, in general, that if the area of each side and end be calculated separately, the sum of those areas will be the whole surface of any prism, whether right or oblique; or, indeed, of any other body whatever.

All prisms are in a ratio compounded of their bases and altitudes; if, then, their bases be equal, they are to each other as their heights; and *vice versa*. Similar prisms, &c. are in a triplicate ratio of their homologous sides, as also of their altitudes.

PRISM, in *Dioptrics*, is a glass in form of a triangular prism, much used in experiments about the nature of light and colours.

The phenomena and use of the prism arise from its separating the rays of light in their passage through it.

The more general of these phenomena are enumerated and illustrated under the articles COLOUR and REFRACTION: for, to enumerate all would be endless; and even these are sufficient to demonstrate, that colours do not either consist in the contortion of the globules of light, as Descartes imagined; nor in the obliquity of the pulses of the ethereal matter, as Hooke fancied; nor in the constipation of light, and its greater or less concitation, as Dr. Barrow conjectured; but that they are original and unchangeable properties of light itself. See LIGHT.

PRISMATIC ANTENNÆ, in *Natural History*, a term used to express the horns or antennæ of a peculiar genus of butterflies. See FEELERS.

PRISMOID, PRISMOIDES, in *Geometry*, a solid figure, having for its two ends any dissimilar parallel plane figures of the same number of sides, and all the upright sides of the solid trapezoids. If the ends of the prismoid be bounded by dissimilar curves, it is sometimes called a cylindroid.

To find the solidity of a prismoid, the general rule is: To the sum of the areas of the two ends, add four times the area of a section parallel to, and equally distant from both ends: multiply the last sum by the height, and one-sixth of the product will be the solidity. Or, if the bases be dissimilar rectangles, take two corresponding dimensions, and multiply each by the sum of double the other dimension of the same end, and the dimension of the other end corresponding to this last dimension: then multiply the sum of the products by the height, and one-sixth of the last product will be the solidity. Note, corresponding dimensions are those, which are connected by a side of the solid.

E. G. How many solid feet of timber are in a tree, whose ends are rectangles, the length and breadth of the one being 14 and 12 inches; and their corresponding sides of the other 6 and 4 inches; and the perpendicular length $30\frac{1}{2}$ feet?

By the first general rule,

$$\left. \begin{array}{l} \frac{14 + 6}{2} = \frac{20}{2} = 10 \\ \frac{12 + 4}{2} = \frac{16}{2} = 8 \end{array} \right\} \text{the dimensions in the middle.}$$

$$\begin{array}{l} 10 \times 8 \times 4 = 320 = \text{four times the middle area.} \\ 14 \times 12 = 168 = \text{area of the greater end.} \\ 6 \times 4 = 24 = \text{area of the less end.} \end{array}$$

This sum is 512 square inches = $\frac{32}{9}$ square feet.

Then $\frac{32}{9} \times \frac{30\frac{1}{2}}{6} = \frac{16 \times 30\frac{1}{2}}{9 \times 3} = \frac{162\frac{1}{2}}{9} = 18\frac{2}{7}$ feet, the solidity.

By the second or particular rule,

Let L, l, be one dimension of each corresponding to each other, and B, b, the other corresponding dimensions, and h the height; then, L being = 14, B = 12, l = 6, b = 4 inches, and h = $30\frac{1}{2}$ feet, we shall have $(2L + l)$

$$B + (2l + L)b \times \frac{1}{2}b = \frac{34 \times 12 + 26 \times 4}{6 + 144} \times 30\frac{1}{2} = 18\frac{2}{7} \text{ feet, as before. Hutton's Mens. p. 193.}$$

PRISON. See **GAOL, PUNISHMENT, and TRANSPORTATION.**

PRISON Breaking, by the offender himself, when committed for any cause, was felony at the common law (1 Hal. P. C. 607.); or even conspiring to break it: (Braët. l. 3. c. 9.) But this severity is mitigated by the statute *de frangentibus prisonam*, (1 Edw. II.) which enacts that no person shall have judgment of life or member for breaking prison, unless committed for some capital offence. So that to break prison when lawfully committed for any treason or felony, remains still felony as at the common law; and to break prison, when lawfully confined upon any other inferior charge, is still punishable as a high misdemeanor by fine and imprisonment. For the statute which ordains, that such offence shall be no longer capital, never meant to exempt it entirely from every degree of punishment. Blackst. Com. vol. iv. See **ESCAPE.**

Breaking of prison, by the law of Scotland, is a punishable offence; but there are no particular laws against it in that country, so they are guided by the Roman law in such cases. But though this law seems to make the punishment of this crime capital, yet this is thought too great severity in Scotland, where an arbitrary punishment, greater or less, according to the circumstances of the escape, and the violence with which it was accomplished, is thought sufficient and adequate.

PRISONER, in *Law*, one that is restrained of his liberty upon any action civil or criminal, or upon commandment.

A man, again, may be prisoner, either upon matter of fact, or of record.

PRISONER, upon matter of record, is he, who being present in court, is, by the court, committed to prison.

PRISONER, upon matter of fact, is he who is committed upon an arrest, be it by the sheriff, constable, or other.

PRISONERS of War. See **CAPITULATION.**

The right of making prisoners of war is founded on the principles of security and self-defence; either that they may not take up arms against their victors, or that their own party may be weakened, or that by getting into the power of the conqueror, some person or child for whom the vanquished sovereign has an affection, this sovereign may be induced to assent to equitable or advantageous conditions of peace, in order to obtain the deliverance of these valuable pledges. But as soon as your enemy has laid down his arms and surrendered his person in a battle or siege, you have no further right over his life, unless he should give you such a right by some new crime, or had before committed against you a crime deserving death. It was therefore a dreadful error of antiquity, indeed a most unjust and savage claim, to assume a right of putting a prisoner to death, and even by the hand of the executioner. It is now, however, a long time since our just and humane principles have taken place. Accordingly in a battle, quarter is to be given to those who lay down their arms, and at a siege, a garrison offering to capitulate are never to be refused their lives. The humanity with which most nations in Europe carry on wars at present cannot be too much commended: if sometimes in the heat of action the soldier refuses to give quarter, it is always contrary to the inclination of the officers, who eagerly interpose for saving the lives of such enemies as have laid down their arms. See **QUARTER** and **REPRISALS.**

As to the treatment of prisoners of war, they may be secured, and for this purpose shut up; and if there is cause to fear their rising or running away, they may be even fettered. But they are not to be treated harshly, unless personally guilty towards him who has them in his power. Among European nations, prisoners of war are seldom ill-treated. And what is more, by a custom which equally displays the humanity of the Europeans, an officer, taken prisoner of war, is released on his parole, and enjoys the comfort of passing the time of his imprisonment in his country, with his family; and the party releasing him thinks itself as secure of him as if it had detained him in the closest prison. On the other hand, it was formerly a question, whether, if the number of prisoners was so great as not to be kept or fed with safety, it was right to put them to death? or, whether in such circumstances they should be sent back to the enemy at the hazard of their strengthening him, so as on another occasion to gain the advantage? At present the case is plain. These prisoners are sent back on their parole, not to carry arms for a certain time, or to the end of the war. An enemy may require from prisoners, in consideration of their release, that they shall not carry arms against him till the end of the war, having a right to keep them prisoners during that time. But he cannot require that they shall for ever renounce the liberty of fighting for their country, as at the end of the war their imprisonment ceases: and they, on their side, cannot take upon themselves an engagement absolutely contrary to their quality as citizens or subjects. If, indeed, their country forsakes them, they are free, and equally entitled to a renunciation on either side.

Another question has been started in reference to this subject. Are prisoners of war to be made slaves? This may be answered in the affirmative, in cases which give a right to kill them, when they have rendered themselves personally guilty of some crime deserving death. The ancients used to sell their prisoners of war for slaves, because they thought that they had a right of putting them to death. But in every circumstance, in which a prisoner's life cannot innocently be taken away, we have no right to make him a slave. "What is life," says Vattel, "without freedom? If any one counts life a favour, when the grant of it is attended with chains, let him enjoy it, let him accept the kindness, submit to his conditions, and fulfil his duties! But they are not what I shall teach him; he may find enough said of them in other authors: I shall dwell no longer on the subject, and indeed this disgrace of mankind is happily extinct in Europe."

Prisoners of war are detained, that they may not return again to the enemy, as also for obtaining from their sovereign a just satisfaction, as the price of their liberty; nor is there any obligation to release those who are detained with the latter view, till after satisfaction is obtained. As to the former, whoever makes a just war has a right, if he thinks proper, to detain his prisoners till the end of the war. And then, on releasing them, he may justly require a ransom, either as a compensation at a peace, or, if the war continues, for diminishing his enemy's finances, at the same time that he strengthens him with the return of soldiers. The European nations, who are ever to be commended for their care in alleviating the evils of war, have, with regard to prisoners, introduced humane and salutary customs. They are exchanged or ransomed even during the war, and this is generally stipulated in a previous cartel. However, if a nation finds a considerable advantage in leaving its soldiers prisoners with the enemy during the war, rather than exchange them, it may certainly, unless bound by cartel, act as is most agreeable

able to its interest. This would be the case of a state abounding in men, and at war with a nation more formidable by the courage than the number of its soldiers. It would have been of little advantage to the czar, Peter the Great, to restore the Swedes, his prisoners, for an equal number of Russians. But the state is obliged, as soon as it can be done without danger, and has the means in its hands, to deliver, at its own expence, such of its citizens and soldiers as are prisoners of war. They are fallen under this misfortune only by acting for its service, and in support of its cause. The same reason dictates that it shall provide for their support during imprisonment. Formerly prisoners of war were obliged to redeem themselves, but then the ransom paid belonged to the officer or soldiers who took them: the modern use is more agreeable to reason and justice. If prisoners cannot be delivered during the course of the war, at least their liberty must, if possible, make an article in the treaty of peace. This is a care which the state owes to those who have exposed themselves for it. However, it must be allowed, that every nation may by a law, after the example of the Romans, and for inspiring their soldiers to make the most vigorous resistance, prohibit prisoners of war from being ever ransomed: when this is agreed on by the whole society, nobody can complain; but such a law is very harsh, and could scarcely suit any but those ambitious heroes who were determined on sacrificing every thing for making themselves masters of the world. Vattel's Law of Nations, b. iii. c. 8.

PRISRENDI, in *Geography*, a town of European Turkey, in Servia, the see of a Greek bishop; 43 miles N. of Alessio. N. lat. $42^{\circ} 52'$. E. long. $20^{\circ} 4'$.

PRIST—*Unques* PRIST. See UNCORE.

PRISTINA, in *Geography*, a town of Servia, the see of a Greek bishop; 100 miles E. of Ragusa. N. lat. $43^{\circ} 10'$. E. long. $20^{\circ} 34'$.

PRISTIS, *Saw-fish*, in *Ichthyology*, a genus of fishes in the Linnæan system of the order chondropterigious; but others rank it with the cartilaginous order; and Dr. Shaw thinks it may, with propriety, be considered as a species of the SQUALUS, or shark, which see, of which he makes three varieties. But as we follow the Linnæan system, we shall set down its generic character: snout long, flat, spinous down the edges; four or five spiracles which are lateral; the body is oblong, roundish, covered with a rough coriaceous skin; mouth beneath; nostrils before the mouth, half covered with a membranaceous flap; there are two oval orifices behind the eyes; the ventral fins are approximate; it has no anal fin.

The saw-fish inhabits the Mediterranean, and was known to the ancient Greeks and Romans by the name of pristis.

Species.

ANTIQUORUM. The specific character of this fish is, that its snout is armed with from eighteen to twenty-four strong spines on each side. It inhabits the ocean, is fifteen feet long; the body above is blackish, and beneath whitish. The head is flat on the fore-part; the snout is five feet long; teeth granulate; the eyes large, the iris golden; it has five spiracles. The first dorsal fin is opposite the ventral, the second stands midway between the first and the tail; the pectoral fin is broad and long; the caudal short.

PECTINATUS. The snout of this species has from twenty-five to thirty-four narrow spines on each side. It is an inhabitant of the ocean; resembles the last, but the snout is slenderer and narrower at the base; the spines are longer and slenderer. This and the former species are fully described in the second volume of the Linnæan Transactions.

CUSPIDATUS. The snout has twenty-eight broad, cus-

pidate spines on each side. A specimen of the snout was a few years since preserved in the Leverian Museum. The spines were sharp at the point, like a surgeon's lancet.

MICRODON. The spines on the snout are small, hardly perforating the skin. The habitation of this and of the cuspidatus is unknown, but a complete specimen of the fish was in the Leverian Museum. Its whole length was twenty-eight inches long; the snout ten inches; the dorsal fins much hollowed out at the back part.

CIRRATUS. Snout cirrate in the middle; spines long, with intermediate shorter ones. Found on the coast of New Holland, about forty inches long; the body is of a pale brown. See Linn. Transf. vol. ii., where it is described and figured.

PRIT, in *Law*, a word used in pleading, when, after the prisoner hath pleaded not guilty, *non culpabilis*, the clerk of the assize, or clerk of the arraigns, on behalf of the crown replies, that the prisoner is guilty, and that he is ready to prove him so. This is done by two monosyllables, "*culprit*," which signify, first, that the prisoner is guilty, "*cul.*" or "*culpabilis*," and then that the king is ready to prove him so; *prit*, *præsto sum*, or *paratus verificare*. This is a replication on behalf of the king *viva voce* at the bar: and this was formerly the course in all pleadings, as well in civil as in criminal causes. This was done in the concise manner; for when the pleader intended to demur, he expressed his demurrer in a single word, "*judgment*," signifying that he demanded judgment whether the writ, declaration, plea, &c. either in form or matter, were sufficiently good in law: and if he meant to rest on the truth of the facts pleaded, he expressed that also in a single syllable, "*prit*;" signifying that he was ready to prove his assertions. By this replication, the king and the prisoner are at issue in point of fact. The usual conclusion of all affirmative pleadings, as this of "*cul.*" or guilty is, was by an averment in these words, "and this he is ready to verify; *et hoc paratus est verificare*"; which same thing is here expressed by the single word "*prit*." See CUL-PRIT.

PRIT'HU, and PRIT'HVI, in *Hindoo Mythology*, are names and forms of Vishnu and Lakshmi. They are found to be personifications of the earth, and a great deal of fable, with some traces of historical tradition, are mixed together in the relations connected with this subject. The immediate ancestor of Prit'hu, whose name was Vena, was an impious and tyrannical prince, and, in consequence of Brahmanical denunciation, died without issue. To remedy this, his arm was opened and churned with a stick, till it produced a son, who proved to be a form of Vishnu, and was named Prit'hu. He married a form of the goddess Lakshmi, who was named Prit'hvi, being indeed the earth. She became obstinate, and refusing her wonted supplies to mankind, Prit'hu was forced to beat and wound her, when she, assuming the form of a cow, ascended to Meru to complain to the gods; who, on hearing that she refused the necessaries of life to mankind, and to her husband, rejected her complaint, and she was forced to submit to the treatment complained of. By this it is supposed is meant, that Prit'hu, who is found to correspond with Noah, an agriculturalist, cut down forests, used the plough, &c. by such means maiming and disfiguring the earth, which he and his descendants were authorized to do.

Prit'hvi, as a personification of the earth, also represents *patience*: the Hindoos refer to the earth, or Prit'hvi, proverbially, as an example of patience; permitting her bowels to be ripped open, her surface lacerated, and suffering every indignity, without resentment or murmuring, and even returning all good for all such evil usage. Prit'hvi-pati, lord of the earth, is a title conferred on terrestrial, or real, as well

well as on mythological sovereigns. Prit'hvi is sometimes spoken of as a cow, milked by Swayambhuva, or Adam, grand ancestor of Prit'hu. She is sometimes called the daughter, as well as the wife of Prit'hu, under the name of Ila, another personification of the earth, of very equivocal history. See ILLA.

In Menu's Institutes, c. ix. v. 311, it is said, that "as Prit'hvi supports all creatures equally, so a king, sustaining all subjects, resembles in his office the goddess of earth." In this character she shares the daily Brahmanical oblations offered to the gods. On an examination of the character and history of Prit'hvi, she is found to correspond with the Tellus, Terra, Vesta, &c. of Grecian mythology. The consort of Siva, as noticed under the article PARVATI, sometimes appears in the character of goddess of the earth, and is then called Bhudevi: but Prit'hvi is always considered a form of Lakshmi.

PRITZ, JOHN-GEORGE, in *Biography*, a learned German Lutheran divine, was a native of Leipzig, where he was born in the year 1662. He pursued his studies in the university of that city, where he took his degree of M.A. in 1685; and two years afterwards he enlisted in the number of contributors to the "Acta Eruditorum" of Leipzig. In 1690 the senate nominated him preacher at St. Nicholas' church; in 1693 he took the degree of bachelor of divinity; and in 1698 he was created doctor in that faculty, and accepted of an invitation to become professor of divinity, and of metaphysics, as well as minister, at Zerbst, in Saxony. In the year 1705 he visited Holland and England, and after his return to Germany, in 1707, was chosen professor of divinity, ecclesiastical counsellor, and minister at Greifswalde, in Pomerania. Here he continued till the year 1711, when he removed to Frankfort on the Maine, where he held the appointment of principal minister, till his death in 1732, when he was about 70 years of age. He published "Patris Macarii Ægyptii Homiliæ, Græcè et Latine, interprete Zacharia Palthenio;" "Macarii Ægyptii Opera, Græcè et Latine," consisting of the rest of the works attributed to Macarius the elder. "Introductio in Lectionem Novi Testamenti," which is highly esteemed, and has been repeatedly printed: an edition of the New Testament in the original Greek, with various readings, geographical charts, &c.; and a great number of philosophical and theological dissertations, controversial pieces, &c. Moreri.

PRITZERBE, in *Geography*, a town of the Middle Mark of Brandenburg, on the Havel; 7 miles N.N.W. of Brandenburg.

PRITZLER'S HARBOUR, a bay on the N. side of Hudson's straits. N. lat. 62°. W. long. 67° 10'.

PRITZWALK, a town of Brandenburg, in the Mark of Pregnitz; 44 miles N. of Brandenburg. N. lat. 53° 11'. E. long. 12° 16'.

PRIVAS, a city of France, and principal place of a district, in the department of the Ardèche, seated on a small river, about six miles from the Rhone; 18 miles S.W. of Valence. The town contains 2923, and the canton 11,743 inhabitants, on a territory of 200 kilometres, in 15 communes. N. lat. 44° 44'. E. long. 4° 40'.

PRIVATE *Average, Charters, Nuisance, Spirit, Statute, and Wrong.* See the substantives.

PRIVATE *Act.* See STATUTE.

PRIVATE *Stealing* from a man's person. See LARCENY.

PRIVATEERS, are vessels of war, armed and equipped by particular merchants, &c. and furnished with a military commander by the admiralty, or the officers who superintend the marine department of a country, to cruise against the

enemy, and take, sink, or burn their shipping, or otherwise annoy them as opportunity offers.

These vessels are generally governed on the same plan with his majesty's ships, though often guilty of shameful depredations.

Persons concerned in privateers administer at their own costs a part of a war, by providing ships of force, and all other military stores, and they have, instead of pay, leave to keep what they can take from the enemy, allowing the admiral his share, &c.

Privateers may not attempt any thing against the laws of nations, as to assault an enemy in a port or haven under the protection of any prince or republic, whether he be friend, ally, or neuter, for the peace of such places must be inviolably kept; and therefore, by a treaty made by king William and the states of Holland, before a commission shall be granted to any privateer, the commander is to give security if the ship be not above one hundred and fifty tons, in 1500l.; and if the ship exceeds that burthen, in 3000l.; that they will make satisfaction for all damages which they shall commit in their courses at sea, contrary to the treaties with that state; upon pain of forfeiting their commissions, and the ship is made liable. Lex Mercat. or Merch. Compan. 177.

By statute, ships taken by private men of war, were to be divided into five parts, four parts of which to go to the persons interested in the privateer, and the fifth to his majesty; and as a farther encouragement, privateers, &c. destroying any French man of war, or privateer, shall receive for every piece of ordnance in a ship so taken, 10l. reward, &c. 4 & 5 Will. & M.

But by a later statute, the commissioners of the admiralty may grant commissions to commanders of privateers, for taking ships, &c. which being adjudged prize, and the tenth part paid to the admiral, &c. wholly belong to the owners and captors. (See PRIZE.) By 19 Geo. II. c. 37. § 2. it is provided, that insurances on private ships of war, fitted out by any of his majesty's subjects, solely to cruise against his enemies, may be made by or for the owners thereof, interest or no interest, free of average, and without benefit of salvage to the insurer. By 33 Geo. III. c. 66. § 42. ships and goods belonging to any of his majesty's subjects that are re-captured by privateers, shall pay one-sixth part of their true value to the owners, officers, and seamen, of such privateers, for salvage, without any deduction. See SALVAGE.

PRIVATION, PRIVATIO, the absence, want, or defect of something needed or necessary.

In logic, privation, as applied to modes of being, and opposed to negation, denotes the absence of what naturally belongs to the thing we are speaking of, or which ought to be present with it. It was called in the schools *absentia habitus debiti*.

In the canon law, privation is used for an interdiction, or suspension.

Mystic divines use the phrase *privation of God*, for those drynesses which the soul experiences, to whom God does not make himself felt.

The church of Rome teaches, that children, dying without baptism, go into a limbus, where they undergo a privation of the sight of God.

PRIVATION, in *Physics*, is a negative principle, which, with matter and form, the Peripatetics suppose conspires to constitute natural bodies. See PRINCIPLE.

PRIVATIVE, in *Grammar*, a particle, which, prefixed to a word, changes it into a contrary sense.

Thus, among the Greeks, the α is used as a privative; as

in *αθεος*, *atheists*, *acephalus*, &c. The Latins have their privative in: as *in corrigibilis*, *indeclinabilis*, &c. The English, French, &c. on occasion, borrow both the Latin and Greek privatives.

PRIVATIVE *Modes*. See *MODE*.

PRIVATIVE *Quantity*, in *Algebra*, denotes a quantity less than nothing; called also a *negative quantity*; in opposition to affirmative or positive quantities.

Privative quantities are denoted by the character of subtraction — prefixed to them.

PRIVET, in *Botany*. See *LIGUSTRUM*.

PRIVET, *Mock*. See *PHILLYREA*.

PRIVET-*Fly*, in *Entomology*, the name of a species of fly very common on the shrub from whence it has its name. It is called the *erinopterus*, and is remarkable for having its wings deeply divided into segments, so that they seem composed of feathers like bird's wings. The creature, as it fits, looks like a small feather.

PRIVIES to a *Fine*, in *Law*. See *FINE*.

PRIVILEGE, PRIVILEGIUM, formed from the Latin *privata lex*, in the general, any kind of right, prerogative, or advantage, attached to a certain person, condition, or employment, exclusive of others.

PRIVILEGE, in *Law*, is a particular right granted to a single person, place, community, or the like, by which they are exempted from the rigour of the common laws.

Privilege is either *personal* or *real*.

PRIVILEGE, *Personal*, is that which is granted to any person, either against or beyond the course of the common law.

Such, *e. gr.* is that of a member of parliament; who may not be arrested during the sitting of parliament, nor for a certain time before and after. See *ARREST*, and *PARLIAMENT*.

PRIVILEGE, *Real*, is a franchise granted to a place.

Such is that granted to our universities, by which none who are members of it may be called to Westminster-hall upon any contract made within their own precincts. So also a person belonging to the court of chancery cannot be sued in any other court, certain cases excepted; and if he be, he may remove it by *writ of privilege*. It is an ancient privilege for men to be exempted from arrests within the verge of the court, *i. e.* in or near the palace where the king is resident; because, in such cases, quarrels frequently happen; and the peace ought to be strictly kept there.

In the laws of Henry I. it is expressed, that peace ought to be maintained religiously and reverently within four miles of the king's doors towards the four quarters; and forty-nine acres, nine feet, nine palms, and nine barley-corns, around.

PRIVILEGE, in *Commerce*, is a permission from a prince or magistrate, to make and sell a certain merchandize, or to engage in a certain commerce, either exclusively of others, or currently with them.

The first is called an *exclusive* privilege; the latter, simply, a *privilege*.

Exclusive privileges are to be granted rarely, by reason of the hindrance they are of to trade; yet they are sometimes very just and reasonable, by way of reward for the invention of useful machines, manufactures, &c.

Exclusive privileges for *foreign commerce* are usually granted on the following conditions; that the commodities be brought from remote parts, where there is no going without running great risks; that the privilege be only for a limited time; that the persons privileged be not allowed to monopolize, *i. e.* to raise and lower their commodities at pleasure; but that the sale and price be always proportionable to the

expence, interests, &c. and that the privileged assist the state, on occasion, with part of their gains.

PRIVILEGE for the *impression of books* is properly exclusive; being a permission which an author, or bookseller, obtains under a prince's seal, to have alone the impression of a book, with a prohibition of all others to print, sell, or distribute the same, within a certain term of years, usually fourteen, under the clauses and penalties expressed in it. These privileges were unknown till the beginning of the sixteenth century, when they were introduced in France. The oldest is said to bear date in the year 1507, and to have been occasioned by some printers counterfeiting the works of others as soon as they appeared.

But people were yet at liberty to take or let them alone at pleasure, till the interests of religion, and the state, occasioned the restraining of this liberty.

In 1563, Charles IX. published a celebrated ordonnance, forbidding any person, on pain of confiscation of body and goods, to print any letter, speech, &c. without permission.

The like has been since done in England; though, at present, privileges are not only not required, but by the late act, for securing the properties of books, seem needless. See *LITERARY Property*.

PRIVILEGE, *Attachment of*. See *ATTACHMENT*.

PRIVILEGE, *Bill of*. See *ARREST*.

PRIVILEGES of the *Clergy*. See *CLERGY*.

PRIVILEGES of the *King*. See *KING* and *PREROGATIVE*.

PRIVILEGES of *Parliament*. See *PARLIAMENT*.

PRIVILEGE of the *Tabouret*. See *TABOURET*.

PRIVILEGE, *Writ of*, in *Law*, an ancient writ, by which courts of justice took cognizance of privileges of parliament, in the nature of a *superfedeas* to deliver the party out of custody when arrested in a civil suit. (Dyer, 59. 4 Pryn. Brev. Parl. 757.) For when a letter was written by the speaker to the judges, to stay proceedings against a privileged person, they rejected it as contrary to their oaths of office. (Latch. 48. Noy. 83.) But since the statute 12 W. III. c. 3. which enacts, that no privileged person shall be subject to arrest or imprisonment, it hath been held that such arrest is irregular *ab initio*, and that the party may be discharged upon motion. (Stra. 989.) It is to be observed, that there is no precedent of any such writ of privilege, but only in civil suits; and that the statute of 1 Jac. I. c. 13. and that of king William (which remedy some inconveniences arising from privilege of parliament) speak only of civil actions. And therefore the claim of privilege hath been usually guarded with an exception as to the case of indictable crimes (Com. Journ. 17 Aug. 1641); or, as it hath been frequently expressed, of treason, felony, and breach (or surety) of the peace. (4 Inst. 25. Com. Journ. 20 May 1675). By which it seems to have been understood that no privilege was allowable to the members, their families, or servants, in any *crime* whatsoever; for all crimes are treated by the law as being *contra pacem domini regis*. And instances have not been wanting, in which privileged persons have been convicted of misdemeanors, and committed, or prosecuted to outlawry, even in the middle of a session (Mich. 16 Edw. IV. in Scacch. — Lord Raym. 1461); which proceeding has afterwards received the sanction and approbation of parliament. (Com. Journ. 16 May 1726). To which may be added, that, a few years ago, the case of writing and publishing seditious libels was resolved by both houses (Com. Journ. 24 Nov. Lords' Journ. 29 Nov. 1763) not to be entitled to privilege; and that the reasons upon which that case proceeded, (Lords' Protest.

Protest. 29 Nov. 1763) extended equally to every indictable offence. So that the chief, if not the only, privilege of parliament, in such cases, seems to be the right of receiving immediate information of the imprisonment or detention of any member, with the reason for which he is detained; a practice that is daily used upon the slightest military accusations, preparatory to a trial by a court martial (Com. Journ. 20 April 1762); and which is recognized by the several temporary statutes for suspending the *habeas corpus* act, particularly 17 Geo. II. c. 6; by which it is provided, that no member of either house shall be detained, till the matter of which he stands suspected be first communicated to the house of which he is a member, and the consent of the said house obtained for his commitment or detaining. But yet the usage has uniformly been, ever since the revolution, that the communication has been subsequent to the arrest. Blackst. Com. b. i.

PRIVILEGED DEBT. See DEBT.

PRIVILEGED Places. See PROCESS.

PRIVILEGIA, or private laws, a denomination given by the Romans to laws *ex post facto*; that is, to laws which were enacted after an action (indifferent in itself) is committed, and the legislator then, for the first time, declares it to have been a crime, and inflicts a punishment upon the person who has committed it. Of these laws Cicero (*de Leg. 3. 19.*) and in his oration (*pro dom. 17.*) thus speaks: "*Vetant leges sacratas, vetant duodecim tabulas, leges privatis hominibus irrogari; id enim est privilegium. Nemo unquam tulit, nihil est crudelius, nihil perniciosius, nihil quod minus hæc civitas ferre possit.*"

PRIVILEGIUM CLERICALE. See CLERGY.

PRIVILEGIUM, *property propter*, denotes that qualified property which a man has in animals "*feræ naturæ*;" so that he may have the privilege of hunting, taking, and killing them, in exclusion of other persons. Here he has a transient property in these animals, usually called *game* (which see), so long as they continue within his liberty; and may restrain any stranger from taking them therein, but the instant they depart into another liberty, this qualified property ceases.

PRIVITY, an intimate freedom, or private familiarity between two persons.

The lawyers say, if there be lord and tenant, and the tenant hold of the lord by certain services; there is a privity between them in respect of the tenure.

PRIVOLNOE, in *Geography*, a town of Russia, in the government of Saratov, on the Volga; 48 miles S. of Saratov.

PRIUS. *Nisi Prius*, in *Law*. See NISI.

PRIVY, a person who is partaker, or has an interest in any action or thing.

In this sense they say, *privies in blood*: every heir in tail is privy to recover the land intailed.

In old law-books, merchants privy are opposed to merchants strangers.

Coke mentions four kinds of privies. *Privies in blood*, as the heir to his father; *privies in representation*, as executors and administrators to the deceased; *privies in estate*, as he in reversion, and he in remainder; donor and donee; lessor and lessee; lastly, *privy in tenure*, as the lord by escheat; *i. e.* when land escheats to the lord for want of heirs.

PRIVY Council, called, by way of eminence, *the council*, a council of state, held by the king with his counsellors, to concert matters for the public service, and for the honour and safety of the realm.

This, according to sir Edward Coke's description of it, (4 Inst. 53.) is a noble, honourable, and reverend assembly

of the king and such as he wills to be of his privy council, in the king's court or palace.

The king's will is the sole constituent of a privy-counsellor; and this also regulates their number, which in ancient time was about twelve. Afterwards it increased to so large a number, that it was found inconvenient for secrecy and dispatch: and therefore king Charles II., in 1679, limited it to thirty; of whom fifteen were to be the principal officers of state, and those to be counsellors, *virtute officii*; and the other fifteen were composed of ten lords and five commoners of the king's choosing. But since that time the number has been much augmented, and now continues indefinite. At the same time also, the ancient office of lord president of the council was revived in the person of Anthony, earl of Shaftesbury; an officer, who by the statute of 31 Hen. VIII. c. 10. has precedence next after the lord chancellor and lord treasurer.

Privy-counsellors are made by the king's nomination, without either patent or grant; and, on taking the necessary oaths, they become immediately privy-counsellors during the life of the king that chooses them, but subject to removal at his discretion.

As to the qualifications of members to sit at this board, any natural born subject of England is capable of being a member of the privy council; taking the proper oaths for security of the government, and the test for security of the church. By the act of settlement, 12 & 13 W. III. cap. 2. it is enacted, that no person born out of the dominions of the crown of England, unless born of English parents, even though naturalized by parliament, shall be capable of being of the privy council.

The duty of a privy-counsellor appears from the oath of office (4 Inst. 54), which consists of seven articles. 1. To advise the king according to the best of his cunning and discretion. 2. To advise for the king's honour and good of the public, without partiality, through affection, love, meed, doubt or dread. 3. To keep the king's counsel secret. 4. To avoid corruption. 5. To help and strengthen the execution of what shall be there resolved. 6. To withstand all persons who would attempt the contrary. And, lastly, in general, 7. To observe, keep, and do all that a good and true counsellor ought to do to his sovereign lord.

The privy council is, or ought to be, the *primum mobile* of the state, and that which gives the motion and direction to all the inferior parts. It is likewise a court of justice of great antiquity; the primitive and ordinary way of government in England being by the king and privy council.

It has been frequently used by all our kings for determining controversies of great importance: the ordinary judges have sometimes declined giving judgment till they had consulted the king and privy council; and the parliament have frequently referred matters of high moment to the same, as being by long experience better able to judge of, and, by their secrecy and expedition, to transact some state affairs, than the lords and commons.

At present, the privy council takes cognizance of few or no matters, except such as may not be well determined by the known laws, and ordinary courts; such as matters of complaint and sudden emergencies: their constant business being to consult for the public good in affairs of state. This power of the privy council is to enquire into all offences against the government, and to commit the offenders to safe custody, in order to take their trial in some of the courts of law. But their jurisdiction herein is only to enquire, and not to punish; and the persons committed by them

are entitled to their *habeas corpus* by statute 16 Car. I. cap. 10. as much as if committed by an ordinary justice of the peace.

In plantation or admiralty causes, which arise out of the jurisdiction of this kingdom, and in matters of lunacy and idiocy, the privy council has cognizance, even in questions of extensive property, being the court of appeal in such causes; or, rather, the appeal lies to the king's majesty himself in council.

From all the dominions of the crown, excepting Great Britain and Ireland, an appellate jurisdiction (in the last resort) is vested in this tribunal; which usually exercises its judicial authority in a committee of the whole privy council, who hear the allegations and proofs, and make their report to his majesty in council, by whom the judgment is finally given.

The privileges of privy counsellors, as such, (abstracted from their honorary precedence,) consist principally in the security which the law has given them against attempts and conspiracies to destroy their lives.

Anciently, to strike in the house of a privy-counsellor, or elsewhere in his presence, was grievously punished: by 3 Hen. VII. cap. 14. if any of the king's servants, of his household, conspire or imagine to take away the life of a privy-counsellor, it is felony, though nothing shall be done upon it; and by 9 Ann. cap. 16. it is enacted, that any persons who, shall unlawfully attempt to kill, or shall unlawfully assault, and strike or wound any privy-counsellor in the execution of his office, shall be felons, and suffer death as such.

With advice of this council, the king issues proclamations that bind the subject, provided they be not contrary to law.

In debates, the lowest delivers his opinion first, the king last, and thereby determines the matter.

A council is never held without the presence of a secretary of state.

The dissolution of the privy council depends upon the king's pleasure; and he may, whenever he thinks proper, discharge any particular member, or the whole of it, and appoint another. By the common law also it was dissolved *ipso facto* by the king's demise, as deriving all its authority from him. But now, to prevent the inconveniencies of having no council in being at the accession of a new prince, it is enacted, by 6 Ann. cap. 7, that the privy council shall continue for six months after the demise of the crown, unless sooner determined by the successor. Blackst. Com. book i.

The officers of the privy council are four clerks of the council in ordinary, three clerks extraordinary, a keeper of the records, and two keepers of the council-chamber.

Lord President of the Privy Council. See PRESIDENT.

Privy Purse, or the king's private expences. See KING and REVENUE.

Privy Seal, a seal which the king uses, previously to such grants, &c. as are afterwards to pass the great seal.

Yet the privy seal is sometimes used in matters of less consequence, which do not require the great seal.

Lord Privy Seal. See KEEPER of the Privy Seal, and LORD Privy Seal.

Clerks of the Privy Seal. See CLERK.

Privy Chamber. See CHAMBER.

Privy Signet. See SIGNET.

Privy Tithes. See TITHES.

Privy Verdict. See VERDICT.

PRIZE. See PRISE.

PRIZE-Cattle, in *Rural Economy*, such cattle or other ani-

mals as have obtained premiums at some of the cattle shows, either from their superiority of form, fatness, or other circumstances.

PRIZING, in *Sea Language*, denotes the application of a lever to move any weighty body, as a cask, anchor, cannon, &c.

PRIZZI, in *Geography*, a town of Sicily, in the valley of Mazara; 10 miles S. of Palermo. N. lat. 37° 46'. E. long. 13° 35'.

PRO, a preposition, signifying *for*, or in respect of a thing, as *pro consilio*, &c. And in law, *pro* in the grant of an annuity, *pro consilio*, shewing the cause of the grant, amounts to a condition. But in a feoffment, or lease for life, &c. it is the consideration, and doth not amount to a condition; and the reason of the difference is, because the state of the land by the feoffment is executed, and the grant of the annuity is executory.

PRO-Confesso. See PRO-CONFESSO.

PRO-Indiviso. See PRO-INDIVISO.

PROA, FLYING, in *Navigation*, a name given to a vessel used in the South Seas, on account of the swiftness with which it sails, being, with a brisk trade-wind, nearly twenty miles an hour. As to the construction of the proa, her head and stern are exactly alike, but her two sides are very different: the side intended to be always the lee-side being flat; and the windward-side made rounding, in the manner of other vessels, and, to prevent her oversetting, which, from her small breadth, and the straight run of her leeward-side, would, without this precaution, infallibly happen, there is a frame laid out to her from windward, to the end of which is fastened a log, fashioned into the shape of a small boat, and made hollow. The weight of the frame is intended to balance the proa, and the small boat is, by its buoyancy (as it was always in the water), to prevent her oversetting to windward; and this frame is usually called an out-rigger. The body of the proa is made of two pieces joined endways, and sowed together with bark, for there is no iron used about her; she is about two inches thick at the bottom, which, at the gun-wale, is reduced to less than one. The sail is made of matting, and the mast, yard, boom, and out-riggers, are all made of bamboo. See the description and drawing of a proa in Anson's Voyage, quarto, p. 341.

The proa generally carries six or seven Indians; two of whom are placed in the head and stern, who steer the vessel alternately with a paddle, according to the tack she goes on; the person in the stern being the steersman: the other Indians are employed either in bailing out the water, which she accidentally ships, or in setting and trimming the sail.

PROAO, in *Mythology*, a divinity of the ancient Germans, who held in one hand a pike, wrapped about with a kind of flag, and in the other a scutcheon not unlike to ours. According to Samuel Groffer, in his History of Lusatia, this god presided over courts of justice, and also the public market, that every thing might be sold there with equity.

PROASM, in *Ancient Poetry*, the same as *Epode*; which see.

PROBABILISTS, a sect, or division, among the Romanists, who adhere to the doctrine of probable opinions; holding, that a man is not always obliged to take the more probable side, but may take the less probable, if it be but barely probable.

The Jesuits and Moralists are strenuous Probabilists. See JESUIT, &c.

Those who oppose this doctrine, and assert that we are obliged, on pain of sinning, always to take the more probable

hable side, are called Probabilists; to which class belong the Jansenists, and particularly the Portroyalists.

PROBABILITY of an Event, in the Doctrine of Chances, is greater or less according to the number of chances by which it may happen, compared with the whole number of chances by which it may either happen or fail. Wherefore, if we constitute a fraction, of which the numerator be the number of chances whereby an event may happen, and the denominator the number of all the chances by which it may either happen or fail, that fraction will be a proper designation of the probability of happening. Thus, if an event has three chances to happen, and two to fail, the fraction $\frac{3}{5}$ will fitly represent the probability of its happening, and may be taken to be the measure of it. The same thing may be said of the probability of failing, which will likewise be measured by a fraction, whose numerator is the number of chances by which it may fail, and the denominator the whole number of chances both for its happening and failing; thus the probability of the failing of that event which has two chances to fail and three to happen, will be measured by the fraction $\frac{2}{5}$. If the fractions which represent the probabilities of happening and failing be added together, their sum will always be equal to unity, since the sum of their numerators will be equal to their common denominator: and since it is a certainty that an event will either happen or fail, it follows, that certainty, which may be conceived under the notion of an infinitely great degree of probability, is fitly represented by unity. De Moivre's Doct. of Chances, p. 1, &c. See CHANCES, EXPECTATION, and GAMING.

PROBABILITY of Life. See EXPECTATION of Life, and LIFE Annuities.

PROBABILITY, in Reasoning, *verisimilitude*; or an appearance of truth.

To define it philosophically, probability is the appearance of the agreement or disagreement of two things by the intervention of proofs, whose connection is not constant and immutable, or is not perceived to be so; but is, or appears, for the most part, to be so; so as to suffice to induce the mind to judge the proposition to be true or false, rather than the contrary.

That proposition, then, is probable, for which there are arguments and proofs to make it pass, or be received for true.

The entertainment the mind gives to this sort of propositions, is called *belief*, *assent*, or *opinion*.

Probability, then, being to supply the defect of our knowledge, is always conversant about propositions of which we have no certainty, but only some inducements to receive them for true: and this probability relates either to matter of fact, which falling under observation, are capable of human testimony, or to things which, being beyond the discovery of our senses, are not capable of any such testimony; called matters of speculation.

According to Aristotle, a proposition is probable, if it seem true to all or most people, and those the wiser and more reputable sort: but by *seem* he means, what, after a close inquiry, shall seem to be true.

Of probability there are various degrees, from the confines of certainty and demonstration, down through improbability and unlikeliness, to the confines of impossibility; and also degrees of assent from certain knowledge, and what is next to it, full assurance and confidence, quite down to conjecture, doubt, distrust, and disbelief.

The grounds of probability are, in short, these two following: *viz.* the conformity of any thing with our own particular knowledge, experience, or observation, called

internal probability; and the testimony of others, vouching their observation, or experience, called *external* probability.

It was a doctrine of the New Academy (see ACADEMY), that the senses, the understanding, and the imagination, which frequently deceive us, cannot be infallible judges of truth; but that from the impressions which we perceive to be produced on the mind, by means of the senses, we infer appearances of truth, or probabilities. Accordingly Carneades, an eminent orator and philosopher of that academy, maintained that though these impressions, which he called phantasies or images, do not always correspond to the nature of things, and there is no infallible method of determining when they are true or false, and consequently that they afford no certain criterion of truth, nevertheless, probable appearances are a sufficient guide, with respect to the conduct of life and the pursuit of happiness, because it is unreasonable not to allow some degree of credit to those witnesses who commonly give a true report. He divided probabilities into three classes; simple, uncontradicted, and confirmed by accurate examination. The lowest degree of probability takes place, where the mind, in the casual occurrence of any single image, perceives in it nothing contrary to truth and nature: the second degree of probability arises, when, contemplating any object in connection with all the circumstances associated with it, we discover no appearance of inconsistency, or incongruity, to lead us to suspect that our senses have given a false report; as when we conclude, from comparing the image of an individual man with our remembrance of that man, that he is the person we supposed him to be: and the highest degree of probability is produced, when, after an accurate examination of every circumstance which might be supposed to create uncertainty, we are able to discover no fallacy in the report of our senses. The judgments arising from this operation of the mind, are, according to the doctrine of the New Academy, not science, but opinion, which is all the knowledge that the human mind is capable of attaining.

In the doctrine of probability, one important observation may be made, *viz.* that if one premise only of an argument be probable, the conclusion is necessarily probable; but if two or more premises be probable, the conclusion will not be necessarily probable. Thus, for instance, supposing the probability of each premise expressed by $\frac{7}{10}$, the probability of the conclusion will be but $\frac{49}{100}$, which shews it to be improbable. For we may call any thing improbable, if the measure of the chance for its happening is less than $\frac{1}{2}$. If there had been three premises, and the probability of each equal to $\frac{7}{10}$, the probability of the conclusion would be $\frac{343}{1000}$, which is considerably improbable. Again, supposing the probability of the truth of each premise to be 2 to 1, or expressed by $\frac{2}{3}$, the probability of the conclusion in the case of the two premises would be $\frac{4}{9}$. Where three premises are assumed to infer a conclusion, this would be $\frac{8}{27}$; and in case of four premises, the probability of the conclusion would be but $\frac{16}{81}$, which is less than $\frac{1}{5}$, so that one might with advantage lay 4 to 1 against the truth of a conclusion founded on four probable premises, for the truth of which, separately taken, 2 to 1 might be laid. It is to be observed in all these cases, that the premises are supposed independent, that is, not necessarily connected with each other. Hence it is easy to account how it happens, that the most plausible political and physical reasonings lead so often to conclusions false in fact.

M. de Moivre has solved two problems, tending to establish the degree of assent that ought to be given to experience.

rience. He determines from his solutions, that if, after taking a great number of experiments, it should have been observed, that the happenings or failings of an event have been very near in a ratio of equality, it may safely be concluded, that the probability of its happening or failing at any one time assigned, are very near equal.

And if, after taking a great number of experiments, it should be perceived, that the happenings and failings have been nearly in a certain proportion, such as 2 to 1, it may safely be concluded, that the probabilities of happening or failing, at any one time assigned, will be very nearly in that proportion; and that the greater the number of experiments has been, so much the nearer the truth will the conjectures be that are derived from them.

Chance very little disturbs the events which, in the natural institution, were designed to happen or fail according to some determined law. For if, in order to help our conception, we imagine a round piece of metal, with two polished opposite faces, differing in nothing but their colour, of which one may be supposed to be white, and the other black, it is plain that this piece may with equal facility exhibit a white or black face; and we may even suppose that it was framed with that particular view of shewing sometimes the one face, sometimes the other; and that consequently, if it be tossed up, chance will decide the appearance. But although chance may produce an inequality of appearance, and that a greater inequality, according to the length of time in which it may exert itself, still the appearance, either one way or the other, will perpetually tend to the proportion of equality. This is, in like manner, applicable to a ratio of inequality; and thus in all cases it will be found, that although chance produces irregularities, still the odds will be infinitely great, that in process of time those irregularities will bear no proportion to the recurrency of that order which naturally results from original design. See De Moivre's Doctrine of Chances, p. 231, 243. See *Moral CERTITUDE*, and *Doctrine of CHANCES*.

PROBABILITY, in *Poetry*, denotes the appearance of truth in the fable or action of a poem.

There are four kinds of actions: for a thing may be either only true or only probable; or true and probable at the same time; or neither the one, nor the other.

These four kinds of actions are shared between four arts: history takes the first, still keeping to truth, without regard to probability.

Epic and dramatic poetry have the second, and still prefer probability, though false, to an improbability, though true. Thus the death of Dido, who killed herself on her being deserted by Æneas, though false in itself, is a fitter subject for a poem, than the action of Sampson, or the Maid of Orleans.

Moral philosophy takes the third; and the fabulists, as Æsop, &c. the fourth.

Boslu adds, that the epopœia, in its nature and essence, uses truth and probability like morality; yet, in its certainty and expressions, takes a liberty like that of Æsop; instances of which we have in the Æneid.

Poetical probability may be so either in respect of the rules of theology, or morality, nature, reason, experience, or opinion.

As to *theology*, there is scarcely any thing but is probable, in this respect; because nothing is impossible to God. This is an expedient the poets have frequent recourse to, in order to bring things feigned contrary to the order of nature, within the bounds of probability. See this considered under the article MACHINE.

As to *morality*, we have observed, it requires both truth

and verisimilitude: an ancient poet was condemned on the theatre for a slip in it: viz. for making a person, whom he represented as an honest man, say, that "though his tongue swore, his mind did not."

Seneca accuses Virgil of an offence against *natural* probability in saying, that the winds were pent up in caves; for, says that philosopher, wind being only air in motion, to suppose it at rest, is to destroy its nature. To which Vossius answers, that the poet only speaks of the natural origin of winds; which are produced in mountains by vapours, &c. pent there; just as we should say, the winds are inclosed in an *æolipile*.

Virgil, likewise, committed an offence against natural probability, by making Æneas find deer in Africa; because that country produces none.

Indeed these faults are excusable, because, as Aristotle finely observes, they are not faults in the poet's art, but they arise from his ignorance of something taught in the other arts.

However, care must be taken they be not too gross: there being some probabilities of this kind, with which Æsop himself could not dispense; he would never be forgiven, were he to represent a lion fearful, a hare daring, a fox stupid, &c.

Probability, in respect of *reason*, is frequently broken in upon by those who affect nothing but the *merveilleux*. Here Statius is a notorious offender: Tydeus, being surprised in an ambuscade by fifty bravoës, who had vowed his death, kills forty-nine of them, and pardons the last. But the principal and most important kind of probability is that in respect of *common opinion*. A thing is probable, when it looks like truth: but sometimes it shall appear true to the people, and false to the learned; and *vice versa*. When, then, the learned and the people are divided, to which side must the poet adhere? Suppose, for instance, the adventure of Penelope, the history of Medea, Helena, or the like: what Virgil and Homer have written of them shall appear probable to the populace, yet the learned read the contrary in history; some authors having written, that Dido was chaste, and Medea innocent; that Penelope was divorced and banished, by Ulysses, for abusing his absence; and that Helena never saw Troy.

This point is soon decided: Homer and Virgil make no scruple of deviating from history to improve their fables; and Horace does not send the poets to the truths of history; but either to fables already invented, or to common fame. All which is confirmed by Aristotle.

To these kinds of probability may be added another, which we call *accidental* probability: it consists not in the using of several incidents, each probable apart; but in disposing them so as to hang probably together.

A man, *e. gr.* may probably die of an apoplexy; but that this should happen just in the moment when the poet wanted it for an unravelling, is highly improbable.

It is an offence against this kind of probability, to produce an incident all at once, and without any preparation which yet needed one. Virgil is wonderfully exact in this point: Juno prepares the tempest raised in the first book; Venus in the same book prepares the amours of the fourth. The death of Dido, in the end of the fourth, is prepared on the first day of marriage; Helenus, in the third, disposes the whole matter of the sixth; and in the sixth, the Sibyl predicts all the wars that follow.

PROBABLE OPINION, a term a long time controverted among the Romish casuists; usually defined, an opinion founded on a grave motive, or an apparently good foundation,

tion, and which has authority enough on its side to persuade a wise disinterested person to assent to it.

Others define a probable opinion to be that, which, being compared with the contrary opinion, becomes problematical, by a perfect equality of the reasons on each side; so that there is nothing in reason or nature to determine on this side, rather than that.

But the Jesuits go still farther, and maintain, that to render an opinion probable, it suffices that it be either built on a reason of some consequence, or on the authority of some one grave doctor. With these qualifications it is allowable to follow it, even though it be less probable and less certain than the contrary opinion; thus it is said, that an opinion or precept may be followed with a good conscience, when it is inculcated by four, three, or two, nay even by one, doctor of any considerable reputation, even though it be contrary to the judgment of him that follows it, and even of him that recommends it. Here it is that the venom of probability lies; as this doctrine rendered the Jesuits capable of accommodating themselves to all the different passions of men, and to persons of all tempers and characters, from the most austere to the most licentious.

This doctrine is attacked, with infinite address, by M. Pascal in the Provincial Letters; on which account they were burnt publicly at Paris. The doctrine of the Jesuits was also attacked by Perrault in his "La Morale des Jesuites, &c." published at Mons, in 3 vols. 8vo. in 1702; which shared the same fate with the Provincials of Pascal. The attack is farther pursued in Arnauld's "La Morale Pratique des Jesuites," 8 vols. 8vo. of which a second edition was published at Amsterdam in 1742.

One of the twenty-four patriarchs of the Jesuits, Castro Palaio, asserts, that a judge, in a question of right, may give sentence, according to a probable opinion, against a more probable one; and this contrary to the judgment and persuasion of his own mind; "imo contra propriam opinionem." Escobar, tr. 6. ex. 6. n. 45.

So Vasquez maintains, that it is lawful to follow the less probable and less secure opinion, discarding the more probable and more secure one.

Lessius and Escobar, treating of the question, Whether a man may kill another for giving him a box on the ear? decide it to be a probable opinion, and speculatively true; though there may be some inconveniences in the practice, for which it would be as well to let it alone. "In praxi tutam et probabilem judicarunt—sed non facile admittendam." Let. Provinciales, p. 307, 308.

PROBABLE *Presumption*, in *Law*. See PRESUMPTION.

PROBANDA, PROPRIETATE. See PROPRIETATE.

PROBANG, in *Surgery*, signifies a long smooth piece of whalebone, to one end of which is fixed a bit of sponge. It is used for pushing extraneous substances down the œsophagus.

PROBATE of a *Will or Testament*, in *Law*, is the exhibiting and proving a will and testament before the ecclesiastical judges delegated by the bishop, who is ordinary of the place where the party dies.

The granting of probates of wills regularly belongs to the ecclesiastical courts; but some courts baron have this right by prescription, as the manor of Mansfield, and those of Cowle and Caversham in Oxfordshire.

When the will is proved, the original must be deposited in the registry of the ordinary; and a copy of it in parchment is made out under the seal of the ordinary, and delivered to the executor or administrator, together with a certificate of its having been proved before him; all which together is usually styled the *probate*. The person before

whom the testament is to be proved is, generally, the bishop of the diocese where the testator dwelled, or his officer.

If all the goods of the deceased be in the same diocese, then the bishop of the diocese, or the archdeacon, according as their composition leads, has the probate of the testament. If the goods lie dispersed in several dioceses, so that there be any sum or note, *bona notabilia*, as five pounds, in two distinct dioceses or jurisdictions, then the will must be proved, or administration taken out, before the metropolitan of the province, by way of special prerogative; whence the court where the validity of such wills is tried, and the office where they are registered, are called the prerogative court, and the prerogative office, of the provinces of Canterbury and York. The power of granting probates and administrations of the goods of persons dying, for wages or work done in the king's docks and yards, shall be in the ordinary of the diocese where the person dieth, or in him to whom power is given by such ordinary, exclusive of the prerogative court, &c. 4 Ann. cap. 16.

This probate may be made two ways; either in *common form*, or *per testes*. The proof in *common form* is only by the oath of the executor, or party exhibiting the will, who swears upon his belief, before the ordinary or his surrogate, that the will exhibited by him, is the last will and testament of the deceased.

This is the practice, it is said, through the province of Canterbury; but within the province of York, it hath been usual (though now discontinued in some of the dioceses) also to swear one witness to the will.

The proof *per testes*, by *witnesses*, or in *form of law*, is when, over and besides his own oath, he also produces witnesses, or makes other proof to confirm, that it is the last will of the deceased; and this in the presence of such as may pretend some interest in the goods of the deceased; or at least in their absence, after they have been lawfully summoned to see such a will proved, if they think fit.

The latter course is commonly taken when there is fear of some strife, or dispute about the deceased's goods: for some hold, that a will proved in common form only, may be called in question any time within thirty years after.

It is not necessary, to the proof of a written will, that the witnesses hear it read, so as that they can depose that the testator declared before them, that the self-same writing now produced is or was his last will and testament.

Where a will disposes of lands and tenements of freehold, it is now frequently proved by witnesses in chancery. It is said (1 P. Will. 741.) that in proving a devise of lands, the proper way is, that the witness should not only prove the executing of the will by the testator, and his own subscribing in his presence, but likewise that the rest of the witnesses subscribed their names in the testator's presence; and so one witness proves the full execution of the will.

Besides those forms of proving testaments already recited, which are referred to that kind of probation which is called the "publication of the testament," there is yet another form, which is called the "opening of the testament," which respects written or closed testaments, in the making of which the civil law did require that the witnesses should put to them their seals; and after the death of the testator, at the opening of the written or closed testament, the same law did also require that the same witnesses should be called by the magistrates to acknowledge their seals, or to deny the sealing. But as we do not observe that solemnity of the civil law in the sealing of the testaments by the witnesses, no more do we observe that solemnity which the civil law requireth in opening of testaments sealed; unless this may seem to have some resemblance with this third form about the

the opening of the testament, which is enacted by the statute of the 21 Hen. VIII. c. 5, which saith, that "the bishop, ordinary, or other person having authority to take probate of testaments, shall, upon the delivery of the seal and sign of the testator, cause the same seal to be defaced, and thereupon incontinent re-deliver the same seal unto the executor or executors, without claim or challenge thereunto to be made."

Dr. Swinburne says, if a testament be made in writing, and afterwards be lost by some casualty; yet if there be two witnesses (*i. e.* in the case of goods and chattels), which did see and read the testament written, and do remember the contents thereof, those two witnesses so deposing of the tenor of the will are sufficient for the proof thereof in form of law: so that they be otherwise, as well in respect of their skill as of their integrity, greater than all exception, and specially some other likelihoods concurring therewithal to make their testimony more credible.

By a constitution of archbishop Stratford; "after the testament shall be proved, according to custom, before the ordinary; the execution or administration of any goods shall not be committed, but to such as shall faithfully promise to render a just account of their administration, when they shall thereunto be duly required by the ordinary." (Lind. 177.) In the same constitution it is added, that those to whom the execution or administration is committed, shall give sufficient security to render a just account of their administration, when duly required by the ordinary.

All previous circumstances being settled, the bishop's officers are to keep the will original, and certify the copy thereof in parchment under the bishop's seal of office; which parchment, so sealed, is called the will proved.

The devise of a personal estate is not considered of any effect until probate is made of the will by the executor; neither can any executor or other person give a will in evidence concerning a personal chattel without producing the probate: and a probate obtained in the ecclesiastical court cannot be set aside in any other court either of law or equity. But the probate of a will, or a copy of the will out of the register of the spiritual court, is not to be allowed as evidence in the case of lands.

Regularly, that is, by the civil law, testaments ought to be insinuated in the official or commissary of the bishop of the diocese within four months next after the testator's death; but an executor is a complete executor before probate, to all purposes but bringing of actions. By 21 Hen. VIII. c. 5. the ordinary, or other person having authority for probate of testaments, may convene before them persons named executors of any testament, to the intent of proving or refusing the testament, as they might do heretofore. (See also 1 Ed. VI. c. 2.) And the ordinary may sequester the goods of the deceased, until the executors have proved the testament; so may the metropolitan, if the goods be in divers dioceses. (Swinb. *a.* 477, 478.) And if the executors do not appear upon the process, the ordinary may excommunicate them; but they may pray time to advise: and the ordinary may grant in the mean time letters "ad colligendum bona defuncti." On the other hand (inasmuch as the executor, though he may be sued, and pay debts, and release an action, yet cannot have an action, before probate), the ordinary is bound to prove the will; and on his refusal, a writ will go to the temporal court, to compel him to proceed to probate, where the will is not controverted: but if the validity of the will is contested, it is a sufficient answer by the ordinary to a writ of mandamus, to return, that a suit is depending before him concerning the same, and not yet determined.

By 21 Hen. VIII. cap. 5. it is enacted, that on probate of wills, &c. 6*d.* and no more shall be taken by the register, where the goods of the deceased do not exceed 5*l.* value; and when the goods are above the value of 5*l.* and under 40*l.*, the fee to the bishop or ordinary shall be 2*s.* 6*d.*, and to the register 1*s.* And if the goods exceed 40*l.* value, in to the bishop or ordinary 2*s.* 6*d.*, and to the register 2*s.* 6*d.*; which, however, he may refuse, and take 1*d.* for every ten lines of the will, &c. And if the officer takes more than his due fees, he shall forfeit 10*l.*, to be divided between the king and the party grieved. See also 31 Geo. II. cap. 10. which relates to seamen and marines.

By 48 Geo. III. c. 149. the following stamp duties are imposed on probates and letters of administration:

Above the value of 20 <i>l.</i> and under the value of 100 <i>l.</i>		the value		£	s.	d.
Of the value of	100 <i>l.</i> and under	200 <i>l.</i>		0	10	0
-----	200 -----	300		2	0	0
-----	300 -----	450		5	0	0
-----	450 -----	600		8	0	0
-----	600 -----	800		11	0	0
-----	800 -----	1,000		15	0	0
-----	1,000 -----	1,500		22	0	0
-----	1,500 -----	2,000		30	0	0
-----	2,000 -----	3,500		40	0	0
-----	3,500 -----	5,000		50	0	0
-----	5,000 -----	7,500		60	0	0
-----	7,500 -----	10,000		75	0	0
-----	10,000 -----	12,500		90	0	0
-----	12,500 -----	15,000		110	0	0
-----	15,000 -----	17,500		135	0	0
-----	17,500 -----	20,000		160	0	0
-----	20,000 -----	25,000		185	0	0
-----	25,000 -----	30,000		210	0	0
-----	30,000 -----	35,000		260	0	0
-----	35,000 -----	40,000		310	0	0
-----	40,000 -----	45,000		360	0	0
-----	45,000 -----	50,000		410	0	0
-----	50,000 -----	60,000		460	0	0
-----	60,000 -----	70,000		550	0	0
-----	70,000 -----	80,000		650	0	0
-----	80,000 -----	90,000		750	0	0
-----	90,000 -----	100,000		850	0	0
-----	100,000 -----	125,000		950	0	0
-----	125,000 -----	150,000		1,200	0	0
-----	150,000 -----	175,000		1,400	0	0
-----	175,000 -----	200,000		1,600	0	0
-----	200,000 -----	250,000		2,000	0	0
-----	250,000 -----	300,000		2,500	0	0
-----	300,000 -----	350,000		3,000	0	0
-----	350,000 -----	400,000		3,500	0	0
-----	400,000 -----	500,000		4,000	0	0
-----	500,000 -----	or upwards 6,000		5,000	0	0

See EXECUTOR and WILL.

PROBATICA PISCINA. See PISCINA.

PROBATION, in a *Monastic Sense*, a time of trial; or the year of noviciate, which a religious must pass in a convent to prove his virtue and vocation, and whether he can bear the severities of the rule.

The year of probation commences from the day of novices taking the habit.

PROBATION, in the *Universities*, denotes the examination and trial of a student who is about to take his degrees. See DEGREE.

PROBATIONER, in the *Presbyter Discipline*, a person licensed by a presbytery to preach; which is usually done a year before he be ordained.

A student

A student in divinity is not admitted probationer till after several trials; the first, private, before a presbytery; the second, public, before a congregation, the presbytery being present.

The private trials are a homily and exegesis, *i. e.* a theological subject is given to the presbytery in theses, and the candidate answers any objections started against it.

The public trials are a popular sermon, and an exercise and addition, *i. e.* a text is handled, half an hour logically and critically, and half an hour more practically. If he acquit himself to the satisfaction of the presbytery, he signs the confession of faith, and owns the Presbyterian government, &c.; upon which he receives a licence to preach.

PROBATOR, in *Law*, an accuser or approver; one who undertakes to prove a crime charged upon another: properly, an accomplice in the crime, who impeaches others.

PROBATUM EST, *q. d.* it is proved; a term frequently subjoined to a receipt for the cure of some disease.

PROBE, a surgeon's instrument with which to sound and examine the circumstances of wounds, ulcers, and other cavities.

PROBE, *Anel's*. See FISTULA *Lachrymalis*.

PROBENCIO, in *Geography*, a town of Spain, in New Castile; 25 miles S.W. of Alarcon.

PROBERSDORFF, or PROTTESDORFF, a town of Austria, on the river Leyta; 12 miles W.S.W. of Brugg.

PROBLEM, *Προβλημα*, in *Logic*, a doubtful question; or a proposition that neither appears absolutely true, nor false; but which is probable on both sides, and may be asserted either in the negative or affirmative, with equal evidence.

Thus, that the moon and planets are inhabited by animals in some respect like us, is a problem: that the fixed stars are also suns, and each the centre of a separate system of planets and comets, is a problem.

PROBLEM is also a proposition expressing some natural effect, proposed in order to a discovery of its apparent cause. Such are the problems of Aristotle.

A logical or dialectical problem, say the schoolmen, consists of two parts; a subject, or subject matter, about which the doubt is raised: and a predicate or attribute, which is the thing doubted whether it be true of the subject or not.

There are four topical predicates; *viz.* *genus*, *definitio*, *proprium*, and *accidens*: whence arise four different kinds of dialectical problems. The first, when the thing attributed to the subject is in the relation of a genus; as, whether fire be an element or not? The second, when the thing attributed as the effect of a definition; as, when it is asked, whether or no rhetoric be the art of speaking? The third, when the attribute imports a propriety; as, whether it belong to justice to give every one their due? The last is when the thing attributed is adventitious: as, whether justice is to be desired?

Problems, again, may be divided into those relating to things to be done, or avoided, called *ethical*; those relating to the knowledge of nature, called *physical*; and those relating to spirits, called *metaphysical* problems, &c.

PROBLEM, in *Geometry*, denotes a proposition in which some operation, or construction, is required; as to divide a line, to make an angle, to draw a circle through three points not in a right line, &c.

Messieurs of the Port Royal define a *geometrical* problem, a proposition given to be demonstrated, in which something is required to be done; and what is done, to be proved to be the thing required.

A problem, according to Wolfius, consists of three parts. The proposition, which expresses what is to be done. The resolution, or solution, wherein the several steps, by which the thing required is to be effected, are orderly rehearsed. The demonstration, in which is shewn, that by doing the several things prescribed in the resolution, the thing required is obtained.

Accordingly the general tenor of all problems is this; the things prescribed in the resolution being done, the thing required is done. See *GEOMETRICAL Solution of a Problem*.

PROBLEM, in *Algebra*, is a question or proposition which requires some unknown truth to be investigated or discovered; and the truth of the discovery demonstrated.

In this sense it is a problem, *to find a theorem*. Algebra is defined to be the art of resolving all problems that are resolvable.

PROBLEM, *Kepler's*, in *Astronomy*, is the determining of a planet's place from the time; thus called from the astronomer Kepler, who first proposed it.

The problem, stated in form, stands thus: to find the position of a right line, which, passing through one of the foci of an ellipsis, shall cut off an area described by its motion, which shall be in any given proportion to the whole area of the ellipsis.

The proposer knew no way of solving the problem directly and geometrically; and therefore had recourse to an indirect method; for which he was taxed with an *αγεωμετρικια*, or want of geometry; and his astronomy charged with not being geometrical. But the problem has since been solved directly and geometrically several ways, by several authors; particularly Sir Isaac Newton, Dr. Keil, &c.

As to the solution of this problem, the late excellent mathematician Mr. Machin observes, that many attempts have been made, at different times, but never yet with tolerable success, towards the solution of the problem proposed by Kepler: to divide the area of a semicircle into given parts, by a line from a given point of the diameter, in order to find an universal rule for the motion of a body in an elliptic orbit. For among the several methods offered, some are only true in speculation, but are really of no service. Others are not different from his own, which he judged improper. And as to the rest, they are all some way or other so limited and confined to particular conditions and circumstances, as still to leave the problem in general untouched. To be more particular, it is evident, that all constructions by mechanical curves are seeming solutions only, but in reality unapplicable; that the roots of infinite serieses are, upon account of their known limitations in all respects, so far from affording an appearance of being sufficient rules, that they cannot well be supposed as offered for any thing more than exercises of a method in calculation. And then, as to the universal method, which proceeds by a continued correction of the errors of a false position, it is, when duly considered, no method of solution at all in itself; because, unless there be some antecedent rule or hypothesis to begin the operation (as suppose that of a uniform motion about the upper focus, for the orbit of a planet; or that of a motion in a parabola for the perihelion part of the orbit of a comet; or some other such), it would be impossible to proceed one step in it. But as no general rule has ever yet been laid down to assist this method, so as to make it always operate, it is the same in effect as if there were no method at all. And accordingly in experience it is found, that there is no rule now subsisting but what is absolutely useless in the elliptic orbits of comets; for in such cases there is no other way to proceed but that which was used by Kepler:

to compute a table for some part of the orbit, and therein examine if the time to which the place is required, will fall out any where in that part. So that, upon the whole, it appears evident, that this problem, contrary to the received opinion, has never yet been advanced one step towards its true solution. Vide Machin, in Phil. Trans. Martyn's Abridg. vol. viii. p. 73.

Mr. Machin afterwards proceeds to give his own solution of this problem, which is particularly necessary in orbits of a great excentricity; and he illustrates his method by examples, for the orbits of Mercury, of Venus, of the comet of the year 1682, and of the great comet of the year 1680, all which shew the universality of that method. See ANOMALY, and EQUATION of the Centre.

PROBLEM, *determinate, diophantine, indeterminate, limited, linear, local, plain, solid, surfsolid, and unlimited.* See the adjectives.

PROBLEM, *Deliacal*, in *Geometry*, is the doubling of a cube. This problem coincides with that for finding two mean proportionals between two given lines; whence that also is called the *deliac* problem. See DUPLICATION.

PROBLEMATICAL RESOLUTION, in *Algebra*, a method of solving difficult questions by certain rules, called *canons*.

PROBOLIUM, among the Romans, a kind of spear, which hunters used in hunting boars.

PROBOSCIDEA, in *Botany*, so called from the very long beak of the fruit. See MARTYNIA.

PROBOSCIPLECTANUS, in *Natural History*, a name given by some authors to a peculiar and very elegant species of penicillus marinus, which has somewhat of a funnel-like shape, and has its mouth surrounded by a number of thin hair-like filaments. See PENICILLI *Marini*.

The first who has described this particular species is the accurate Fabius Columna, from whom Klein has engraven a figure of it.

PROBOSCIS, *προσοσκις*, the trunk or snout of an elephant, and of some other animals.

The proboscis is a member issuing out of the middle of the forehead, serving instead of a hand; and having a little appendix fastened to the hand of it, in form of a finger. By the proboscis the she-elephant, it is said, sucks herself; and by the same conveys the milk to her young. All quadrupeds have the length of their neck equal to that of their feet, the elephant alone excepted; in which the shortness of the neck is compensated by the length of the proboscis. See ELEPHANT.

Theameleon has also a kind of trunk or proboscis, which is its tongue; and which it darts nimbly out of its throat as if it spat it; and draws it in again instantaneously. It serves, like the elephant's trunk, to lay hold on, and take in its food. See CAMELEON.

The microscope shews us a little trunk or proboscis in flies and gnats, by means of which they suck the blood of animals, or liquors, for their food.

PROBOSCIS of *Flies*. See TRUNK, ENTOMOLOGY, FLY, and INSECT.

PROBSTORFF, in *Geography*, a town of Austria; three miles S.E. of Entzerdorff.

PROBSTZELLE, a town of Saxony, in the principality of Altenburg; six miles S. of Saalfeld.

PROBULEUMA, *Προβουλεμα*, among the Athenians, a decree or vote of the areopagus, or senate of Athens.

It was so called because agreed upon by the senate, with a design to have it afterwards propounded to an assembly of the people, that it might receive from them a farther ratification, without which it could not be passed into a law, nor

have any force or obligatory power after the end of that year, when the senators and other magistrates laid down their commissions. Potter, *Archæol. Græc. lib. i. cap. 18. tom. i. p. 100.*

PROBUS, M. AURELIUS, in *Biography*, a Roman emperor, was born about the year 232, at Sirmium, in Pannonia. He entered young into the Roman army, and distinguished himself so much by his valour and integrity, that the emperor Valerian raised him to the post of tribune before the legal age for that advancement. In a battle with the Sarmatians and Quadians he obtained a civic crown, by rescuing from the hands of the enemy a young man of rank related to the emperor. In every station he shewed himself superior to the trust committed to him. After having subdued the Marmarides in Africa, and quelled a rebellion at Carthage, he was employed to recover Egypt from the Palmyrenians, who, under the famous Zenobia, had conquered that country. This important business he effected, and so well established was his reputation at that period, that when, after the death of Aurelian, Tacitus was nominated to the empire by the senate, in his speech to decline that charge he proposed Probus in his stead. On the murder of Tacitus in 276, his half-brother Florianus, at the head of an army near the Bosphorus, assumed the purple as by right of inheritance; but at the same time the army of the East conferred the imperial dignity upon their commander Probus. A civil war succeeded, which in two months was terminated by the death of Florianus, and Probus was recognised by the troops of his rival. He then wrote a very modest letter to the senate, to whom he submitted his pretensions; and his deference was rewarded by an unanimous vote, conferring upon him the usual titles and prerogatives. In return, he issued a declaration, confirming the privileges of the senate, to whom he committed the whole administration, contenting himself almost solely with the military command. One of the first exertions of his authority was the punishment of the conspirators against Aurelian and Tacitus. He then marched into Gaul, which he cleared, after several victories, of those numerous tribes of barbarians which had ravaged and occupied a great many towns and districts of that country. He followed the vanquished across the Rhine, laid waste a large tract of country, and compelled nine of their petty kings to throw themselves at his feet, and supplicate for peace. To protect from invasion the Gallic colony settled in Suabia, he erected a stone wall, with towers at proper intervals, which extended from the Danube near Ratisbon, to Wimpfen on the Neckar, and finally terminated on the Rhine, after a winding course of nearly 200 miles. He undertook to reduce the Isaurians, a fierce band of robbers in Asia Minor, and made himself master of their principal town. After this he proceeded to the frontiers of Persia. The king of that country, alarmed at his approach, sent an embassy to him, which found him encamped on the mountains of Armenia. He was dining on pork and peas when the deputies arrived, whom he astonished by the plainness of his dress, and the simplicity of his manners, while he made them tremble by the sternness with which he delivered a menacing message to their master. The differences between the two empires were for the present accommodated, but Probus did not renounce his purpose of making war upon the Persians, though he was, for the present, recalled to his European territories, by the necessity of taking measures to prevent revolts among the barbarians whom he had vanquished. His policy with respect to this, was to transport great bodies of the conquered nations to a distance from their own homes, and settle them upon unoccupied lands in remote provinces of the empire. Thus a number of

of Vandals were conveyed to the central parts of Britain, in which situation they continued a distinct tribe: by means such as these he kept the frontiers in a state of tranquillity. The people of Alexandria having proclaimed Saturnius, a commander in the East, emperor, he thought it prudent to withdraw into Palestine without accepting the honour. But reflecting on the improbability of remaining as a private man in a state of safety, he suffered the soldiers to confirm the tumultuary election, and prepared for his defence. Probus had a high respect for him, and offered him a free pardon; but he had, in his own estimation, gone too far, and he was slain: the same fate occurred to Proculus and Bonofus, two military commanders that had excited rebellions in Gaul. The return of peace in 281, was celebrated by the emperor with a triumph over the distant nations of the Germans, &c., in which he presented to the people of Rome the usual spectacles of gladiators, the chase of wild beasts, and other amusements, with great magnificence. A more useful benefit was bestowed on his subjects, in taking off Domitian's interdiction against planting vines, in favour of the Gauls, the Spaniards, and the Pannonians; so that the fine wines of Burgundy, Champagne, and Tokay, may be said to owe their origin to Probus. He employed the soldiery in planting and other useful labours, over whom he constantly exercised a constant and strict, but by no means severe, discipline. It was, however, his wise policy of keeping them regularly employed in peace as well as in war, that was at last the cause of his untimely end. He had determined to improve the land about Sirmium, of which he was a native; "but," says the historian, "in the prosecution of a favourite scheme, the best of men, satiated with the rectitude of their own intentions, are subject to forget the bounds of moderation; nor did Probus himself sufficiently consult the patience and disposition of his fierce legionaries. The dangers of the military profession seem only to be compensated by a life of pleasure and idleness; but if the duties of the soldier are incessantly aggravated by the labours of the peasant, he will at last sink under the intolerable burden, or shake it off with indignation." The imprudence of Probus is said to have inflamed the discontent of the troops. More attentive to the interests of mankind than to those of the army, he expressed the vain hope, that by the establishment of universal peace, he should soon abolish the necessity of a standing and mercenary army. The unguarded expression proved fatal to him. In one of the hottest days of summer, as he severely urged the unwholesome labour of draining the marshes of Sirmium, the soldiers, impatient of fatigue, on a sudden threw down their arms, and broke out into a furious mutiny. The emperor, conscious of his danger, took refuge in a lofty tower constructed for the purpose of surveying the progress of the work. The tower was instantly forced, and a thousand swords were plunged at once into the bosom of the unfortunate Probus. The rage of the troops subsided as soon as it had been gratified. They then lamented their fatal rashness, forgot the severity of the emperor whom they had massacred, and hastened to perpetuate, by an honourable monument, the memory of his virtue and victories. Gibbon. Univer. Hist.

PROBUS, M. VALERIUS, a Latin grammarian, lived in the second century, under the emperor Adrian. He wrote several treatises, of which one, cited by Servius, was entitled "De Temporum Connexione." Some fragments of his writings have been published among the "Grammatici Latini Veteres." Moreri.

PROBY'S ISLAND, in *Geography*, a small island in the Pacific ocean, so called by Capt. Edwards in 1791; denomi-

nated by the natives "Onoo-afou." S. lat. 15° 53'. W. long. 175° 51'.

PROCACCINI, GIULIO-CESARE, in *Biography*, was the son of Ercole Procaccini of Bologna, a painter of considerable note, and an imitator of Corregio. He was born in 1548, and was at first educated as a sculptor, but abandoned the chisel for the pencil; the instrument of an art less laborious and more ingenious. In Bologna he frequented the academy of the Caracci, and it is said, that in reply to some sarcasms of Annibal, he struck and wounded him. The principal object of his studies were the works of Corregio, and in the opinion of many, none ever approached nearer the grandeur of that style. In easel pictures, and works of confined composition, he has not seldom been mistaken for Corregio, though his grace be often meretricious, and his colour less vigorous. Thus, a Madonna of his at St. Luigi de Francesi, has been engraved as the work of Allegri; and some still better imitations may be seen in the palace of St. Vitali at Parma, in that of Carega at Genoa, and elsewhere.

Of his various altar-pieces, the most Corregiesque is perhaps that of St. Afra in Brescia: it represents Maria with the infant, amid an ogling and smiling group of angels and saints; where dignity seems as much sacrificed to grace, as in the mutual smile of the Virgin and the angel in his Nunziata, at St. Antonio of Milan; grimaces both, unworthy of the moment and of the mystery.

He is sometimes equally blameable for extravagance of attitude, as in the executioner of St. Nazario; a picture else composed of charms and beauties. But notwithstanding the number and copiousness of his works, his design is correct, his forms and draperies select, his invention varied, and the whole together has a certain grandeur and breadth which he either acquired from the Caracci, or like them derived from Corregio. He died in 1626, at the age of 78.

Procaccini had two brothers, both painters; but not of equal merit with himself. Camillo, who practised in history painting, and Carlo Antonio, who adopted landscape. The latter left a son, Ercole, called the Young, who painted flower-pieces with considerable skill, and died in 1676, aged 80. Fufeli.

PROCATARCTIC CAUSE, in *Medicine*, from προαρχω, *I precede*, or *pre-exist*, is the pre-existent or *pre-disponent* cause of a disease, which renders the body liable to be excited to disorder by certain subsequent and immediate causes. Thus, a hot climate or season induces a disposition to be affected with bilious diseases, when intemperance or sudden chill may influence the body, the heat being the *procatarctic*, and the intemperance or chill the *exciting* cause of the bilious affections. See CAUSE, in *Medicine*.

PROCEDENDO, in *Law*, a writ whereby a plea or cause, formerly called from an inferior court to the chancery, king's bench, or common pleas, by writ of privilege, habeas corpus, or certiorari, is released, and returned to the other court to be *proceeded* in; upon its appearing that the defendant has no cause of privilege, or that the matter comprised in the party's allegation is not well proved.

Non PROCEDENDO ad assisam rege inconsulto. See NON.

PROCEDURE, PROCEEDINGS, the course of the several acts, expeditions, and instructions of a process or lawsuit.

Procedure is either *civil* or *criminal*. *Civil* procedure is that where the estate alone is concerned: *criminal*, or *extraordinary* procedure, is that where the person is prosecuted.

Proceedings are also *summary* and *regular*.

PROCEED, among *Merchants*, that which arises from a thing. In which sense they say, the *net* proceed.

PROCELEUSMATICUS, προκελευσματικός; in the *Ancient Poetry*, a foot consisting of four short syllables: as *arietat*.

PROCELLARIA, the *Petrel*, in *Ornithology*, a genus of birds of the order Anseres: the generic character is, bill toothless, a little compressed, hooked at the point; mandibles equal; nostrils cylindrical, tubular, truncate, lying on the base of the bill; feet palmate; the back toe pointing downwards, sessile, sharp, a mere spur.

The birds of this genus, of which there are twenty-four species, live chiefly at sea, and, except at the breeding-time, are seldom seen near land; they have the faculty of spouting from their bills, to a considerable distance, a quantity of pure oil; they feed on the fat and muscle of dead whales, and other large fish. At sea they are capable of enduring the greatest storms, and on shore they possess the faculty of walking.

Species.

OBSCURA. Black, beneath white; membrane connecting the toes is tawny. It is a native of North America, and is about thirteen inches long. Its bill is black, horny at the sides; the nostrils are distinct; the sides of the neck are varied with brown and white; legs black without, pale within.

PACIFICA; Pacific Petrel. Black; dusky beneath; legs spotted with black; bill plumbeous and much hooked; the nostrils are elevated, oval, distinct, obliquely placed; legs pale. It is full twenty-two inches long. It inhabits, in vast flocks, the islands of the Pacific ocean. These flocks disappear at once, dipping under water altogether, and then rising as suddenly.

CÆRULEA; Blue Petrel. Whitish-blue, beneath white; bill and legs blue. It inhabits the southern ocean, and is twelve inches long. The bill is black at the tip, and the legs are blueish; the outer quill-feathers entirely, the next within, the rest tipped with white; the area beneath the eyes and band on the breast dusky.

VITTATA; Broad-billed Petrel. Blueish-ash, beneath white, legs black. This species inhabits the antarctic seas; it lays in holes or rocks; it flies by night in numerous flocks, and is about twelve inches long.

URINATRIX; Diving Petrel. Blackish-brown; white beneath; the bill and chin black; legs blue-green, without the spur behind. It is eight inches and a half long. Inhabits New Zealand in flocks of large numbers; it dives remarkably well, often rising at a considerable distance with surprising agility. The birds of this species croak like frogs, and sometimes make a noise like the cackling of a hen.

PELAGICA; Stormy Petrel; called also the storm-finch, or mother Cary's chicken. The specific character is black, with a white rump. It is only about the size of a swallow, and in its general appearance and flight not unlike that bird. The stormy petrel is rarely seen on our shores, except in some of the northern islands where it breeds in the holes of rocks, or under loose stones, in the months of June and July. At all other seasons it keeps far out at sea. Multitudes of them are seen all over the vast Atlantic ocean, especially before stormy weather. They often skim with incredible velocity along the hollows of the waves, and sometimes on the summits, braving the utmost fury of the tempest. As they appear to run on the surface of the sea, they have their name from an allusion to the apostle Peter's walking on the water. The inhabitants of the Feroe islands draw a wick through the body of this bird, which is by the pro-

cess so covered with grease, as to burn, when lighted, like a candle, and serving the purpose of one. There is a variety with the body black; head and sides blueish; scrag green; wing-coverts and rump spotted with green. Both sorts are excellent divers; they feed on small fishes, are mute during the day, and clamorous in the night. If the birds of this species are seen hovering round the sterns of vessels, it is thought to be a presage of bad weather.

FREGATA; Frigate Petrel. Black, beneath white; legs black. It inhabits the southern seas, and is eight inches and a half long.

FURCATA; Fork-tailed Petrel. Silver-grey; rump white; tail forked; legs black. It inhabits the seas between Asia and America. The bill is black, the upper mandible is much hooked; inner flexure of the wings black; the outer tail-feathers white on the outside.

FULIGINOSA; Sooty Petrel. Mixed black and brown; head grey and sooty; tail forked; wings, bill, and legs black. It inhabits Otaheite, and is eleven inches long; the irids are pale ash.

MARINA; Marine Petrel. Back and wing-coverts brown; crown and neck blueish-ash; rump blueish; cheeks and body beneath white. It inhabits the southern ocean; is eight inches and a half long. Under the eyes, on each side, is a cinereous streak; the legs are black.

DESOLATA; Brown-banded Petrel. Greenish-ash, beneath white; wings and rounded tail dusky, the latter tipped with brown. It is found on and about the island of Desolation, and is eleven inches long. The bill of this species is black, tipped with yellowish; temples and area of the eyes are white; the legs are brown, the membrane connecting the toes is yellow.

NIVEA; Snowy Petrel. Snowy, as its name imports; shafts of the feathers and bill black; legs dusky blue. Inhabits the colder parts of the South sea, and is twelve inches long. Bill and legs blackish-blue; the membrane is pale.

MELANOPUS; Black-toed Petrel. Black, beneath hoary; legs pale; frontlet and chin grey, with minute blackish spots; the bill and part of the toes are black. It inhabits North America, and is thirteen inches long.

* **GLACIALIS**; Fulmar Petrel. Whitish; back hoary; bill and legs yellowish; a variety is white; middle of the back hoary; wings blackish. This species inhabits the southern and northern seas; breeds in Greenland, Spitzbergen, and St. Kilda, and is seventeen inches long: it is a stupid and fearless bird; feeds on fishes, dead whales, and any filthy matter; the flesh is rancid, but eaten by the inhabitants of St. Kilda, &c. The oil is very highly esteemed, and the young bird, if taken by surprise, yields a pint of it, otherwise it spouts it out in self-defence.

CINEREA; Cinereous Petrel. This is cinereous; beneath white; tail black; bill yellowish; legs blueish. It inhabits the antarctic circle, and is 20 $\frac{1}{4}$ inches long.

GIGANTEA; Giant Petrel. Brownish, spotted with white; it is white beneath; the shoulders, wings, and tail are brown; the bill and legs are yellow. It has a naked, wrinkled, yellow membrane at the angles of the mouth. It is bigger than a goose, being in length full forty inches, and the expansion of the wings is seven feet. It is a very common bird in the high southern latitudes, and sometimes seen, though much more rarely, in the northern seas. It is often seen sailing, with the wings expanded, close to the surface of the water, but without appearing to move them. At Christmas harbour, and Kerguelen's lands, they have been seen so tame, as to be caught without difficulty. Though their

their chief food is fish, they also feed on the carcases of seals and birds.

BRASILIANA. Blackish; lower part of the neck yellow. It inhabits Brazil, is the size of a goose, frequents the mouths of rivers, and makes its nest on the shore.

ÆQUINOCTIALIS; Black Petrel. Brown, without spots; bill yellow; legs brown. A variety has legs reddish-black. The *first* inhabits the Cape of Good Hope and New Zealand; the *second* Kamtschatka: the former is about twenty-three inches long; the latter thirty-five or thirty-six.

GRISEA; Grey Petrel. Sooty; lower wing-coverts white; bill brown; legs blueish on the fore-part. It is a native of the southern hemisphere, and is fourteen or fifteen inches long.

GELIDA; Glacial Petrel. Blueish-ash; back blackish; chin, throat, and breast white; bill yellow; legs blue. It inhabits the icy seas, and is nineteen inches long.

ALBA; White-breasted Petrel. Black-brown; breast, belly, and vent white. A variety is footy, beneath cinereous; face varied with white and brown; legs yellowish; toes and membranes half black. It inhabits the Pacific ocean, and is about sixteen inches long.

ANTARCTICA; Antarctic Petrel. Brown, beneath blueish-white; tail white tipped with black; the legs are of a lead colour. It is a native of the antarctic circle.

CAPENSIS; Pintado. Variegated with white and brown, and sometimes with yellowish and brown; bill and legs black; temples white and black. This is the pintado-bird of Dampier; the white and black spotted petrel of Edwards; and the Cape pigeon of our sailors. It is seldom seen to the north of thirty degrees, and is most frequent about the Cape of Good Hope, and the neighbouring regions. It flies in numerous flocks, which almost sweep the surface of the water. They have been traced to New Zealand, the Falkland islands, and other regions in the southern hemisphere. The sailors often catch them with some tarred string, or a bit of lard on a fishing-rod. Seven hundred have been caught in a night. They feed on fish, but seem to delight on the dead carcases of whales.

* **PUFFINUS;** Shearwater Petrel. Black above; white beneath; legs rufous; bill yellow, tipped with black; hind-head whitish-ash; spurious wings spotted with black; first quill and tail-feathers brown without, and white within. It is about the size of a large pigeon. It inhabits the southern and arctic seas. Breeds in the Isle of Man and in the Orkneys, in the former of which it is called *manks puffin*, and in the latter *lyre*. It takes possession of a rabbit burrow, or other hole, and lays one white egg, blunt at each end, which is hatched in August. The flesh is eatable, but rank. Numbers are killed and barrelled with salt; and in this state they are eaten as we eat salt fish. There is a variety which is cinereous above, white beneath; the tail is of a clear white. It inhabits the southern and arctic seas, and is fifteen or sixteen inches long.

PROCERS, in *Glass Making*, iron instruments, hooked at the extremity, used to settle the pots in their places, whether set too near or too far off.

PROCESS, PROCESSUS, in *Law*, is used for all the proceedings in any cause or action, real or personal, civil or criminal, from the original writ to the end. See **PROCEDURE**.

PROCESS denotes, in a more restrained sense, the means that are made use of, after suing out the original, for compelling the defendant to appear in court: this being the beginning, or principal part, and that by which the rest of the business is directed.

This is sometimes called *original process*, being founded

upon the original writ; and also to distinguish it from *mesne* or intermediate process, which issues, pending the suit, upon some collateral interlocutory matter; as to summon juries, witnesses, and the like. *Mesne* process is also sometimes put in contradistinction to *final* process, or *process of execution*; and then it signifies all such process as intervenes between the beginning and end of a suit. The preliminary step in *civil* process is that of giving notice to the party to obey the original writ, issued for compelling his appearance in court. This notice is given upon all real "præcipes," and also upon all personal writs for injuries not against the peace by *summons*: which see. If the defendant disobeys this verbal admonition, the next process is by writ of *attachment*, or *pone*: which see. If, after attachment, the defendant neglects to appear, he not only forfeits the security he has given, but is moreover to be further compelled by writ of *distingas*, or *distress, infinite*: which see. Here by the common, as well as the civil, law, the process ended in case of injuries without force: the defendant, if he had any substance, being gradually stripped of it all by repeated distresses, till he rendered obedience to the king's writ: and if he had no substance, the law held him incapable of making satisfaction, and therefore looked upon all further process as nugatory. For the process, in cases of injury accompanied with force, see **CAPIAS**.

Such is the first process in the court of common pleas. In the king's bench they *may* also (and frequently *do*) proceed in certain causes, particularly in actions of ejection and trespass, by *original writ*, with *attachment* and *capias* thereon: returnable, not at Westminster, where the common pleas are now fixed, in consequence of Magna Carta, but *ubicunque fuerimus in Anglia*, wherever the king shall be in England; the king's bench being removable into any part of England, at the pleasure and discretion of the crown. But the more usual method of proceeding therein is without any original, but by a peculiar species of process, entitled a *BILL of Middlesex*; which see.

In the exchequer, the first process is by writ of *quo minus*, which see. The three courts set out differently, as we have briefly stated, in the commencement of a suit, in order to entitle the two courts of king's bench and exchequer to hold pleas in causes between subject and subject, which by the original constitution of Westminster-hall they were not empowered to do. Afterwards, when the cause is once drawn into the respective courts, the method of pursuing it is partly much the same in all of them. If the sheriff has found the defendants upon any of the former writs, the *capias, latitat*, &c. he was anciently obliged to take him into custody, in order to produce him in court upon the return, however minute the cause of action might be. For, not having obeyed the original summons, he had shewn a contempt of the court, and was no longer to be trusted at large. But when the summons fell into disuse, and the *capias* became in fact the first process, it was thought hard to imprison a man for a contempt which was only supposed: and therefore in common cases by the gradual indulgence of the courts (at length authorized by statute 12 Geo. I. c. 29, amended by 5 Geo. II. c. 27, made perpetual by 19 Geo. III. c. 70, and extended to all inferior courts by 19 Geo. III. c. 70.) the sheriff, or proper officer, can now only personally serve the defendant with the copy of the writ or process, and with notice, in writing, to appear, by his attorney in court, to defend this action; which, in effect, reduces it to a mere summons. The next part of the process is *bail*; which see. (See also **AC ETIAM**.) Besides the *ac etiam*, added to the writ of *capias*, the man sworn to by the plaintiff is marked upon the

the back of the writ: and the sheriff, or his officer the bailiff, is then obliged actually to arrest or take into custody the body of the defendant; and having so done, to return the writ with a *cepi corpus* endorsed thereon. (See ARREST.) When the defendant is regularly arrested, he must either go to prison, for safe custody: or put in to the sheriff *Special BAIL*; which see. Upon the return of the writ, or within four days after, the defendant must *appear* according to the exigency of the writ. (See BAIL.) When the defendant appears in court, in consequence of *process*, either in person as a prisoner, or out upon bail, the next stage is that of the *pleadings*; which see.

For an account of *process* in criminal cases, see INDICTMENT and CAPIAS. See also CERTIORARI.

By 48 Geo. III. c. 58. § 1. it is enacted that whenever any person is charged with any offence for which he may be prosecuted by indictment or information in the king's bench, not being treason or felony, and the same shall be made to appear to any judge of the same court by affidavit, or by certificate of an indictment or information being filed against such person in the said court for such offence, such judge may issue his warrant under his hand and seal, and thereby cause such person to be apprehended and brought before him or some other judge of the same court, or before some one justice of the peace, in order to his being bound with two sufficient sureties in such sum as the said warrant shall express, with condition to appear in the said court at the time mentioned in the said warrant, and to answer all and singular indictments or informations for any such offence; and if he shall neglect or refuse to become so bound, such judge or justice may respectively commit him to the common gaol of the county, city, or place where the offence shall have been committed, or where he shall have been apprehended, there to remain until he shall become bound as aforesaid, or be discharged by order of the said court in term time, or of one of the judges of the said court in vacation; and the recognizance to be thereupon taken shall be returned and filed in the said court, and shall continue in force until such person shall have been acquitted of such offence, or in case of conviction shall have received judgment for the same, unless sooner ordered by the said court to be discharged; and that where any person, either by virtue of such warrant of commitment, or by virtue of any writ of *capias ad respondendum* issued out of the same court, is now or hereafter shall be committed or detained in any gaol for want of bail, it shall be lawful for the prosecutor to cause a copy thereof to be delivered to such person, or to the gaoler, keeper, or turnkey of the gaol, wherein he is or shall be so detained, with a notice endorsed, that unless such person shall, within eight days from the time of such delivery of a copy of the indictment or information as aforesaid, cause an appearance, and also a plea or demurrer to be entered in the said court to such indictment or information, an appearance and the plea of not guilty will be entered thereto in the name of such person; and in case he shall thereupon for the said space of eight days after such delivery of a copy of the indictment or information as aforesaid neglect to cause an appearance, and also a plea or demurrer to be entered in the said court to such indictment or information, it shall be lawful for the prosecutor, upon affidavit made and filed in the said court, of the delivery of a copy of such indictment or information, with such notice so endorsed to such person, or to such gaoler, keeper, or turnkey as the case may be, which affidavit may be made before any judge or commissioner of the said court authorized to take affidavits in the said court, to cause an appearance and the plea of not guilty to be entered in the said court to such

indictment or information for such person, and such proceedings shall be had thereupon as if the defendant in such indictment or information had appeared and pleaded not guilty according to the usual course of the said court; and if upon the trial thereof the defendant so committed and detained shall be acquitted of all the offences charged there upon him, the judge before whom such trial shall be had, although he may not be one of the judges of the king's bench, may order the defendant to be forthwith discharged out of custody as to his commitment as aforesaid, and such defendant shall be thereupon discharged.

Concerning the execution of the *process*, it is laid down as a general rule, that wherever the king is a party to the suit (as he certainly is to all informations and indictments), the *process* ought to be executed by the sheriff himself, and not by the bailiff of any franchise. (2 Hawk. c. 27.) And if the party be in a house, if the doors be shut, and the sheriff (having given notice of his *process*) demand admittance, and the doors be not opened, he may break open the doors, and enter to take the offender. (2 H. H. 202.) But no person, on the Lord's day, shall serve, or cause to be served, any writ, *process*, &c. except in cases of treason, felony, and breach of the peace, 29 Geo. II. c. 7.

The difference between *process* and *precept*, or *warrant* of the justices, is this; that the precept or warrant is only to attach or convene the party, before any indictment or conviction, and may be made either in the name of the king or the justice: but *process* is always in the king's name, and, usually, after an indictment.

Obstructing the execution of lawful *process* is a high offence; particularly when it is an obstruction of an arrest upon criminal *process*. And it hath been held, that the party opposing such arrest, becomes thereby *particeps criminis*, i. e. an accessory in felony, and a principal in high treason. 1 Hawk. P. C. 12. Blackst. Com. vol. iv.

PROCESS by Attachment. See ATTACHMENT.

PROCESS by Attainder. See ATTAINDER.

PROCESS, Discontinuance of. See DISCONTINUANCE of *Process*.

PROCESS of Outlawry. See OUTLAWRY.

PROCESS, in Anatomy. See PROCESSUS.

PROCESS, in Chemistry, the whole course of an operation, or experiment.

PROCESSION, PROCESSION, in Theology, a term used for the manner in which the Holy Spirit is conceived, by some divines, to issue from the Father and the Son, in the mystery of the Trinity.

The Greeks and Latins are not agreed about the procession of the Holy Spirit.

PROCESSION also denotes a ceremony in the Romish church, consisting in a formal march of the clergy in their robes, and the people after them, putting up prayers, singing hymns, &c. and in this manner making a visit to some church or other holy place.

There are general processions of all the people in jubilees, and the same often in public calamities. The processions of the holy sacrament are very solemn. They have also processions, frequently around the church, at the salutations, &c. in the mass. Anciently, among us, there were, in each parish, customary processions of the parish-priest, the patron of the church, with the chief flag, or holy banner, attended by the other parishioners, each Ascension week; to take a circuit round the limits of the parish, and pray for a blessing on the fruits of the earth. Of which custom there still remains a shadow in that annual perambulation, still called *processioning*; though the order and devotion of the ancient processions be almost lost.

PROCESSUM CONTINUANDO, in *Law*, a writ for the continuance of a process, after the death of the chief justice, or other justices in the commission of oyer and terminer. Reg. Orig. 128.

Recordo & Processu mittendis. See RECORDO.

PROCESSUS, PROCESS, in *Anatomy*, a term applied to many parts of the body, but more particularly in the bones, and usually denoting a prominence. They are too numerous to admit of our enumerating them here.

PROCESTRIA, among the Romans, buildings adjoining to camps, especially winter quarters, or standing camps, where sutlers, strangers, traders, and others that followed the army resided; for they were not permitted to mix with the soldiers, unless when the enemy was near.

PROCHARISTERIA, Προχαριστήρια, in *Antiquity*, a solemn sacrifice which the Athenian magistrates yearly offered to Minerva, when the spring first began to appear.

PROCHELLA, formed of πρῶς and χεῖλος, *lip*, a word used by some authors to express the extremities of the lips.

PROCHEIN AMY, *Proximus amicus*, in *Law*, the nearest friend, or person next akin, to a child in nonage; and who, in that respect, is allowed in law to deal and negotiate for him, to manage his affairs, to see him redressed of any wrong, and to be his guardian, if he hold land in socage.

By prochein amy is commonly understood the guardian in socage: though, in propriety, it is he who appears in court for an infant who sues any action, and aids the infant in pursuit thereof. For, to sue, an infant is not allowed to make an attorney; but the court will admit his prochein amy, next friend, as plaintiff; or his guardian as defendant.

PROCHYMA, a word used by the ancients to express that kind of must which flows spontaneously from the grapes without their being pressed.

PROCICADA, in *Natural History*, a name given by some to the insect which the French call *proci-gale*. It resembles the cicada in most respects, but it has not the power of making the noise that insect does.

PROCIDA, JOHN DI, in *Biography*, a native of Salerno, and lord of the isle of Procida, on the coast of Naples, was a physician by profession, and became a counsellor to Frederic II. and Manfred, kings of Sicily. By Charles of Anjou he was deprived of his estate and employment under pretence of treason, and his wife having been debauched by one of the French who accompanied Charles, he nourished a rooted hatred to that nation, and resolved upon revenge. He visited Sicily disguised in a Franciscan habit, where he concerted a plan for a revolution with the principal malcontents. Hence he went to Constantinople, where he held a consultation with the emperor Palæologus, and obtained from him a supply of money. He next proceeded to Rome, where he readily persuaded pope Nicholas III., who was an enemy of Charles, to concur in the enterprise. When the conspiracy was brought to maturity he repaired to Palermo, where, on East Monday 1282, the massacre began, which ended only in the complete extirpation of the French from the island of Sicily. The circumstances of this dreadful tragedy are thus related by contemporary authors. The chief conspirators had, on that day, assembled at Palermo, where, in the afternoon, they joined with the French in a procession to the church at some distance. A bride with her retinue happening to pass by, a Frenchman went up and began to take indecent liberties with her. He was stabbed on the spot by an enraged Sicilian, which became the signal for the general massacre, that extended to all the French in Palermo, and

thence spread over the whole island. Other accounts say that the massacre began on the ringing of the bell for vespers, and hence it has obtained the name of the *Sicilian vespers*. It is agreed by all, who have touched on the subject, that it was conducted with the most sanguinary ferocity, neither sex nor age being spared, nor even the progeny of Sicilian mothers by French fathers. One man alone, viz. William de Porcelets, a Provençal gentleman, and governor of a town, was dismissed unhurt, in consequence of the high respect inspired by his many virtues. After this Charles made an unsuccessful attempt to recover Sicily, which was possessed by Peter of Arragon, and after his death by his son James. John of Procida continued in the service of these kings, and was sent by the latter to Rome in 1289, to reconcile Sicily to the holy see, but without effect; he resumed his negotiations in 1295, under Boniface VIII.; and, in short, he accompanied the dowager queen Constantia to Rome, where he ended his days. Moreri.

PROCIDA, or *Procita*, in *Geography*, an island in the Mediterranean or Tuscan sea, near the coast of Naples; about five or six miles in circumference. In the thirteenth century it belonged to John of Procida, who was guilty of the notorious massacre of the French in Sicily. The shore is in general high and rocky: its small sea-port, of the same name, is populous and commercial: some of the streets, as well as the roads, are paved with lava. Pheasants abound, and to prevent their destruction the inhabitants are forbidden by law to keep cats; so that the island is overrun with rats and mice, which are dangerous to infants in the cradle; and dogs also are prohibited. N. lat. 40° 50'. E. long. 13° 48'.

PROCIDENTIA, and *Prolapsus Uteri*, a troublesome descent or bearing down of the womb, which, if not restrained, and kept up by art, would in time appear outwardly. See BEARING *down of the Womb*.

PROCIDENTIA *Ani*, in *Surgery*. See PROLAPSUS *Ani*.

PROCIDENTIA *Iridis*. See IRIS, *Prolapsus of*.

PROCIDENTIA *Oculi*. See EXOPHTHALMIA.

PROCIDENTIA *Uteri*. See PROLAPSUS *Uteri*.

PROCIDENTIA *Vaginae*. See VAGINA.

PROCIGALE, in *Natural History*, a name given by Reaumur, and from him by all the French naturalists, to a species of four-winged fly, greatly resembling the cigale, or cicada, but wanting its powers of making a noise.

This creature has a trunk of the same form with that of the cicada, very long, and laid closely upon the belly, and contained in a case or sheath of the same structure with that of this insect. The female has also the same instrument at its tail, prepared for boring holes in wood, and called in that creature the *piercer*, and it uses it to the same purpose, depositing its eggs by means of it in the branches of trees.

There is also another very small insect mentioned by Reaumur, as reducible to this class, if properly of the fly kind; but its smallness makes the structure of its wings scarcely distinguishable with any degree of accuracy; and it is hard to determine whether it has four wings, or two wings and two cases of wings. This little fly is extremely common on rose-trees; its wings are yellowish, and its body white; and it can hop as well as fly. It is hardly possible to find a rose-tree in the summer months that is not loaded with these insects, and they are principally found about the extremities of young branches. Reaumur's Hist. Inf. vol. ix.

PROCINDYNEUONTES, Προκινδυνεωντες, among the Romans, a designation given to the velites, because they were most exposed to danger. The term answers to what we call the forlorn-hope.

PROCKIA,

PROCKIA, in *Botany*, received its name from the celebrated Browne, who communicated the genus to Linnæus, by letter, from America.—Linn. Gen. 271. Schreb. 363. Willd. Sp. Pl. v. 2. 1213. Mart. Mill. Dict. v. 3. Juss. 340. Lamarck Dict. v. 5. 625. Illustr. t. 465. (*Lightfootia*; Swartz Ind. Occ. v. 2. 947.)—Class and order, *Polyandria Monogynia*. Nat. Ord. *Tiliaceæ*? Linn. *Rosaceæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of three leaves (occasionally with two very small leaflets at the base). *Cor.* none. *Stam.* Filaments numerous, capillary, the length of the calyx; anthers roundish. *Pist.* Germen superior, roundish, slightly five-sided; style thread-shaped, the length of the stamens; stigma bluntish. *Peric.* Berry with five angles. *Seeds* numerous.

Obf. From a variation in shape of the style and stigma in some species of *Prockia*, Vahl and Swartz were induced to establish a new genus, which they call *Lightfootia*; but we are inclined to think with Willdenow and Lamarck, that this is not a sufficient difference to authorize such a step. Jussieu considers *Prockia* nearly allied to *Laetia*.

Ess. Ch. Calyx of three leaves, besides two leaflets at the base. Corolla none. Berry with five angles, and many seeds.

1. *P. Crucis*. Linn. Sp. Pl. 745. Vahl. Symb. v. 3. 69. t. 64.—Leaves heart-shaped, ovate, toothed. Flower-stalks terminal, somewhat racemose.—Native of Santa Cruz. The *branches* of this shrub are round, smooth, and purplish. *Leaves* alternate, stalked, smooth, three-ribbed. *Stipulas* sickle-shaped, tapering, toothed, deciduous. *Flowers* about four or five in a cluster, at the ends of the branches. *Berry* the size of a pea, terminated by the permanent *style*.

2. *P. deltoides*. Lamarck Dict. v. 5. 626. Illustr. t. 465. f. 3.—Leaves roundish or deltoid, notched. Flowers lateral, mostly solitary.—Native of the Isle of France, where it was gathered by Commerçon.—*Branches* slender, waved at their tops. *Leaves* alternate, stalked, smooth; the lower ones deltoid, a little pointed; the upper smaller, entire at their base. *Flowers* lateral, solitary, occasionally two or three together. *Fruit* oval.

3. *P. theaformis*. Willd. n. 3.—Leaves lanceolate-elliptical, serrated, bluntish. Flower-stalks axillary, mostly solitary, single-flowered.—Native of the Isle of Bourbon. *Branches* alternate, furrowed, greyish. *Leaves* alternate, stalked, leathery, smooth on both sides. *Flowers* lateral, solitary, on long, smooth stalks. *Fruit* nearly globular, surmounted by a sessile lobed *style*, and therefore, like the following, referred by Vahl to *Lightfootia*.

4. *P. integrifolia*. Willd. n. 4.—Leaves somewhat coriaceous, oblong or obovate, emarginate, nearly entire. Flower-stalks generally crowded together, single-flowered.—Native of the Mauritius.—*Branches* cylindrical, smooth, ash-coloured. *Leaves* alternate, stalked, pale green. *Flowers* axillary, sometimes many together at the axils of the upper leaves. *Fruit* oval, about the thickness of a very small hazel-nut.

5. *P. ovata*. Lamarck Dict. v. 5. 626. Illustr. t. 465. f. 2.—Leaves obtusely ovate, serrated. Flowers solitary, in a sort of umbel.—Native of the same country. This new species of Lamarck's is distinguished by its obtusely oval, long *leaves*, notched with sickle-shaped teeth at their edges, marked with lateral, parallel nerves, and stalked. *Flowers* forming an umbel. *Fruit* oval, small.

6. *P. ferrata*. Willd. n. 2. (*Lightfootia ferrata*; Swartz Ind. Occ. v. 2. 948.)—Leaves oblong-ovate, serrated, pointed. Flower-stalks lateral, aggregate, single-flowered.

Native of Montferrat and the Mauritius. The *branches* of this shrub are round, warty and ash-coloured. *Leaves* alternate, stalked, smooth on both sides. *Flowers* of a pale colour, small. *Fruit* resembling a black currant. This species is occasionally dioecious.

7. *P. laciniata*. Lamarck Dict. v. 5. 627.—Leaves very smooth, oblong-lanceolate, lacinated, very narrow.—Native of the Isle of Bourbon, from whence it was sent to M. Lamarck under the name of *P. trithales*, who tells us the *flowers* of this species are unknown, so that it cannot with certainty be referred to the present genus.

8. *P. lobata*. Lamarck. Dict. v. 5. 627. (Litsea; Illustr. t. 834.)—Leaves ovate, pointed, serrated. Flowers axillary, racemose, very small.—Place of growth unknown. *Branches* smooth, alternate, dotted. *Leaves* alternate, stalked, smooth, toothed, pointed, veined. *Flowers* in short bunches, very small. *Fruit* globular.

PROCLAMATION, **PROCLAMATIO**, an instrument dispatched by the king, with the advice of his privy-council, whereby the people are advertised of something which his majesty thinks fit for them to know; and by which they are sometimes required to do, or not to do, certain things.

The word is of Latin origin, formed from *proclamare* *pa-lam* & *valde clamare*.

Proclamations have the force of laws; but then they are supposed to be consistent with the laws already in being; otherwise they are superseded.

Thus, the established law is, that the king may prohibit any of his subjects from leaving the realm; a proclamation, therefore, forbidding this in general for three weeks, by laying an embargo upon all shipping in the time of war, will be equally binding as an act of parliament, because founded upon a prior law. But a proclamation to lay an embargo in time of peace upon all vessels laden with wheat (though in time of a public scarcity), being contrary to law, and particularly to statute 22 Car. II. cap. 13, the advisers of such proclamation, and all persons acting under it, found it necessary to be indemnified by a special act of parliament, 7 Geo. III. cap. 7.

By the statute 31 Hen. VIII. cap. 8. it was enacted, that the king's proclamations should have the force of acts of parliament, a statute, says Judge Blackstone, which was circulated to introduce the most despotic tyranny, and which must have proved fatal to the liberties of this kingdom, had it not been happily repealed in the minority of his successor. Stat. 1 Edw. VI. cap. 12. Comm. book i.

PROCLAMATION is also used for a solemn denunciation, or declaration of war or peace.

War is an evil, and besides its being undertaken on just grounds, those who are concerned should take every method in their power for preventing it. Accordingly they should endeavour, by declaring their intentions to have recourse to the last remedy against injustice, by the use of open force, to impress the minds of their adversaries, and to excite fear, in order to induce them to adopt equitable and pacific measures. Such is one end of declaring or proclaiming war, after other means of securing uninterrupted conciliation have been ineffectual. This was the mode of proceeding adopted by the Romans, according to the regulations of their "Fecial" law. They first sent the chief of the "Feciales," or heralds, called "Pater patratus," to demand satisfaction of the people who had offended them; and if, within the space of 33 days, a satisfactory answer was not returned, the herald called the gods to be witnesses of the wrong, and came away saying, that the Romans would consider what they had to do. The king, and afterwards the consul, used

used to ask the senate's opinion, and war being resolved on, the herald was sent back to the frontier, where he declared it.

A declaration of war being necessary as a farther trial for terminating the difference without the effusion of blood, by making use of the principle of fear for bringing an enemy to more equitable sentiments; it is, at the same time that it declares the resolution taken of making war, to set forth the cause of that resolution. This is, at present, the constant practice among the powers of Europe. After a fruitless application for justice, a nation may proceed to a declaration of war, which is then *pure* and *simple*. But if it be thought proper to avoid making it two several times, the demand of satisfaction, which the Romans called "*rerum repetitio*," may be accompanied by a *conditional* declaration of war, notifying, that if justice be not done without delay, an immediate war will be the consequence. And then there is no need of a *pure* and *simple* declaration of war, the *conditional* being sufficient, if the enemy delay to give satisfaction. If the enemy, on either declaration, offer equitable conditions of peace, the war ought to be suspended, for when justice is done, all right of employing force is superseded, the use being permitted only for the necessary support of right. To these offers, however, are to be added securities; for we are under no obligation to suffer ourselves to be amused by empty proposals. The word of a sovereign is a sufficient security, whilst he has not disgraced his credit by any act of perfidy; and we should be contented with it. As to the conditions in themselves, besides the essential subject, a reimbursement of the expences may likewise be demanded in regard to the preparations.

The declaration of war must be known to the state against which it is made. This is all which the law of nations requires; yet custom having introduced some formalities, those nations which, by adopting the custom, have given a tacit consent to the formalities, are under an obligation of observing them, till they have publicly renounced them. Formerly the powers of Europe used to send heralds or ambassadors to declare war; at present this is only done in the capital, the principal towns, or on the frontiers; manifestoes are issued, and the communication, so easy and expeditious since the establishment of posts, soon spreads the intelligence.

Besides the foregoing reasons, it is necessary for a nation to publish the declaration of war for the instruction and direction of its own subjects, in order to fix the date of the rights belonging to them from the moment of this declaration, and relatively to certain effects which the voluntary law of nations attributes to a war in form. Without such a public declaration of war, it would be difficult to settle, in a treaty of peace, those acts which are to be accounted the effects of the war, and those which each nation may consider as wrongs, for obtaining reparation. He who is attacked, and makes only a defensive war, need not declare it; the state of war being sufficiently determined by the declaration of the enemy, or his open hostilities. An act of aggression may, in some cases, be considered as a declaration of war. However, either from dignity, or for the direction of his subjects, a sovereign, though attacked at present, seldom fails of declaring war in his turn. If a nation against which a war has been resolved on, will not admit any minister or herald to declare it, whatever the custom otherwise be, it is sufficient for the other nation to declare it within its own territories, and on the frontier, and if the declaration does not come to its knowledge before hostilities are commenced, the former can only blame itself. But no person being exempted from his duty, only because another has been wanting in *his*, we are not to omit declaring war against a nation be-

fore hostilities are commenced, because this nation had, on another occasion, attacked us without any declaration. That nation, in so doing, has violated the law of nature; and its fault is no warrant for us to be guilty of the like.

The law of nations does not impose the obligation of declaring war, for giving the enemy time to prepare itself for an unjust defence. The declaration need not be made till the army has reached the frontiers; it is even lawful to delay it till we have entered the enemy's territories, and occupied an advantageous station; yet it must always precede the commission of any hostility. Thus we provide for our own safety, and equally secure the end of the declaration of war, which is, that an unjust adversary may still seriously consider his measures, and avoid the horrors of war, by doing justice. A sovereign who has entered a country, and declared war, may proceed to military operations; but, at the same time, the only legitimate causes of war (see WAR) should not be forgotten. The sovereign that declares war can detain neither those subjects of the enemy that are within his dominions at the time of the declaration, nor any of their effects; because they came into his country on the public faith. He should therefore allow them a reasonable time for withdrawing their persons and their property.

A sovereign should make the declaration of war public, not only to his own subjects, but also to neutral powers. This is necessary to vindicate his conduct in their estimation of it, as well as to obviate all difficulty, with regard to those commodities which neutral nations are carrying to the enemy, and which, in time of war, are called contraband. Declarations of war should either themselves express, or be accompanied with manifestoes that announce the reasons that induce and justify recurrence to arms, and also those general orders that relate to the conduct of the subjects of the state during the progress of the war. In a civilized age it may, perhaps, be thought unnecessary to observe, that in all publications of an authoritative kind, and that issue from the press under the sanction of government, all opprobrious words are to be avoided, together with every expression that indicates hatred, animosity, and rage, because they only degrade those who use them, and excite similar sentiments in the minds of the enemies.

Grotius says, that, according to the law of nations, two things are required to make a war solemn, or in due form, 1. That on both sides it should be by authority of the sovereign; 2. That it should be accompanied with certain formalities. These formalities consist in the demand of a just satisfaction, (*rerum repetitio*), and in the declaration of war, at least on the part of him who attacks, defensive war requiring no declaration, nor even, on urgent occasions, so much as an express order from the sovereign. Vattel's Law of Nations, b. iv.

PROCLAMATION also denotes the act of notifying to the people the accession of a prince to the crown.

The proclamation does not invest the prince with the regal authority; it supposes him already invested with it, and only gives notice of it to the people.

PROCLAMATION of *Estrays*. See ESTRAY.

PROCLAMATION of *Exigents*. See EXIGENT.

PROCLAMATION on *Attachment*. See ATTACHMENT, and COMMISSION of *Rebellion*.

PROCLAMATION of a *Fine*, is a notice openly and solemnly given of it in the court of common-pleas, where it passed, and at all the assizes in the country, held within one year after the engrossing it. See FINE.

These proclamations, at the assizes, are made on transcripts of the fine, sent by justices of the common-pleas to the justices of the assize, and of the peace.

PROCLAMATION, *in case of riot*. See RIOT.

PROCLAMATION, in a *Monastic Sense*, is the accusation of a friar or brother, by another brother, in open chapter, and in presence of the superior and community, for some external crime he has seen him commit.

PROCLAMATION, *Writ of*. See EXIGENT.

PROCLUS, in *Biography*, an eminent mathematician and philosopher of the Eclectic school, was born at Constantinople in the year 410 of the Christian era. He was instructed in grammar learning at Xanthus in Lycia, and from thence he was sent to Alexandria, where he studied eloquence and polite literature, with a view to qualify himself for the profession of the law. He, however, soon abandoned this, for the pursuit of the sciences properly so called. He learnt philosophy under Olympiodorus, and mathematics under Hero, and was distinguished by quickness of conception, and great strength of memory. He acquired a high reputation among his fellow students, by being able, at all times, to give them an accurate summary of the arguments of their master. After spending several years in the Alexandrian schools, Proclus went to Athens, where he first became acquainted with Syrian, to whom he attached himself. By him he was introduced to Plutarch, the son of Nestorius, an eminent teacher of the Eclectic philosophy, by whom he was conducted into the more recondite mysteries of the doctrine. Among other means of improvement he derived great benefit from the practice recommended by Plutarch, of drawing up, from his own recollection, compendious abridgments of the lectures which he had heard from his preceptor. Of his laborious application he afforded evidence at the age of twenty-eight, by having then written, besides several other pieces, his "Commentaries on the Timæus of Plato," abounding with much learning of the times. He was instructed by Plutarch's daughter in the arts of divination, who inherited from her father many secrets of this kind. By these helps, and the diligent perusal of the writings of Plotinus, Porphyry, Jamblicus, &c., he became a complete master, not only of divine science, but of Theurgic powers. He hence became accomplished as a preceptor in the Alexandrian philosophy, and Syrian associated him with himself in the Platonic chair at Athens. It is said that he excelled all his predecessors in this department, and improved the Eclectic system by many new discoveries, and was the author of many opinions which had never before entered the mind of man, both on the subject of physics, and in the sublime science of ideas. His piety is highly extolled; he practised rigorous fastings, and spent whole nights and days in repeating prayers and hymns, that he might thereby prepare himself for immediate intercourse with the gods. He died when he was about the age of 83 years. In his writings, Dr. Enfield says he appears at once a man of learning and a fanatic. They contain a rude and undigested mass of materials, collected with bold variations from the Chaldaic, Orphic, Hermetic, Pythagoric, Platonic, and Aristotelian doctrines, and adorned with fictions and allegories, which, while they involve the subjects upon which the writer treats in thick darkness, discover great luxuriance of imagination. Among the works which Proclus left behind him are, books "De Providentia et Fato;" "De decem Dubitationibus circa Providentiam;" and "Malorum Subsistentia;" Latin versions of which, from the Greek, were given by William de Morbeka, chaplain to the archbishop of Corinth. Godfrey Olearius, and Hugo Grotius, published Latin versions of his Hymns to the Sun, to the Muses, and to Venus. His work "De Sphæra, sive Circulis Cœlestibus Libellus," was copied in part from the Ifagoge of Geminus, an astronomer

of some distinction in the time of Cicero, and frequently published, but in its best form by Bainbridge, Savilian professor of astronomy at Oxford, in 1620. Many other pieces are enumerated in Enfield, some as published, some as still existing in MS., and others no longer extant.

PROCONDYLUS, *περοκονδυλος*, an appellation given to the first point of each finger. See EXTREMITIES.

PRO-CONFESSO, in *Law*. When, upon a bill exhibited in chancery, the defendant appears, and is in contempt for not answering, and in custody; upon an habeas corpus (which is granted by order) to bring him to the bar, the court assigns him a day to answer; which being expired, and no answer put in, a second habeas corpus is granted, and a farther day assigned; by which day, if he answer not, the bill upon the plaintiff's motion shall be taken pro-confesso, or as allowed, unless cause be shewn by a day, which the court usually gives. For want of such cause shewed, upon motion, the substance of the plaintiff's bill should be decreed, *as if it had been confessed* by the defendant's answer; or, after a fourth insufficient answer made to the bill, the matter of fact not sufficiently answered unto, shall be taken pro-confesso.

By stat. 5 Geo. II. c. 25. it is enacted, that in order to prevent a defendant's eluding justice, by absconding to avoid a subpoena, where the defendant cannot be found to be served with process of subpoena, and absconds (as is believed) to avoid being served with it, a day shall be appointed him to appear to the bill of the plaintiff; which is to be inserted in the London Gazette, read in the parish church where the defendant last lived, and fixed up at the Royal Exchange; and if the defendant does not appear upon that day, the bill shall be taken pro-confesso.

PROCONNESIUM MARMOR, a name given by the ancients to a species of marble, called also neuris and elaphonefus, and by some Cyzicum, from the works of a famous statuary of that name, many of which were made of it. It was of a blueish white, lightly variegated with black; this colour usually running in small veins, and not unaptly resembling, in many instances, the course of the veins of a human body in the naked statues. It was also used in the sumptuous buildings of the Romans. See MARBLE.

PROCONSUL, a Roman magistrate, sent to govern a province, with a consular authority.

The proconsuls were appointed out of the body of the senate; and ordinarily, as the year of any one's consulship expired, he was sent proconsul into some province.

The proconsuls had the same honours, &c. with the consuls themselves; except that they had only six lictors and fasces before them.

The proconsuls did not ordinarily hear and determine processes in person, but had that office performed by their assessors, or other judges, constituted or delegated by them.

As the proconsuls had the direction of justice, of war, and of the revenues, they had their several lieutenants in each capacity: these were called *legati*, and were ordinarily nominated by the senate.

The proconsular function only held a year. The charges of their journey, backwards and forwards, were borne by the public, and were called *viaticum*.

After the partition of the provinces between Augustus and the people, those who presided over the provinces of the people were called especially proconsuls. See PRE-FECT.

Livy, lib. viii. and lib. xxvi. mentions two other sorts of proconsuls; *viz.* such as being consuls had their office prolonged beyond the time settled by law; and such as

were invested with this honour, either for the government of the provinces, or the command in war, who before were only in a private station. We also read of such as the senate created proconsuls without a province, merely for the command of the army, and the care of the military discipline; and such as entered on their proconsular office before they were admitted to the consulship, though designed for this honour.

PROCONSUL, in our *Ancient Law Books*, is sometimes used for a justice in eyre, or justice errant.

PROCOPIUS, in *Biography*, one of the later Greek historians, was a native of Cæsarea in Palestine, where he obtained a high reputation as professor of rhetoric, and whence at length he repaired to Constantinople. In the reign of Justinian he engaged the confidence of the great general Belisarius, who made him his secretary, and took him in his company to the campaigns in Asia, Africa, and Italy. The emperor honoured him with the title of *Illustis*, and raised him to the office of prefect of Constantinople. What his religion was is not certainly known, but Gibbon supposes him to have been an occasional conformist to Christianity, with a secret attachment to paganism and philosophy. He died about the year 560.

Procopius was the author of a "History," in eight books, of the public events of his own time, divided into the Persian war, comprised in two books; the Vandalic, in two books; the Gothic, in three: there is an eighth book, which is supplemental and miscellaneous, and comes down to the year 553. It is an elaborate and exact performance: the facts are collected from personal observation or enquiry, and are related with freedom, and interspersed with useful reflections. The characters of the different barbarous tribes which pressed upon the declining empire, are strongly painted. To these he afterwards added a ninth book, which he entitled "Anecdota," or Secret History; and in this Justinian and his empress, Theodora, are drawn with the most odious features; and of the latter, in particular, stories are told, which are a scandal to her sex, as well as to her high station. The books of Procopius on the Gothic war were published by Leonardo Aretino, in Latin, as his own, in 1470. His works were mutilated by the first Latin translators, and the Greek was not printed till 1607. A Paris edition was published by the Jesuit Claude Maltrel in 1663, in two vols. fol. Gr. et Lat. with the omission of most of the anecdotes. These were afterwards published by Monnoye in the first volume of the *Ménagiana*. Moreri. Gibbon.

PROCOPIUS-RASA, or *the Shaven*, a famous leader of the Hussites in Bohemia, was, in early life, sent to study, and afterwards travelled in France, Italy, Spain, and the Holy Land. On his return he was obliged, against his will, to receive the tonsure, and it is said to be ordained priest; but when the war of religion in Bohemia broke out, he joined the Hussites under their great leader Ziska, and displayed so much courage and ability, that he obtained the confidence of that leader and of the party. After the death of Ziska in 1424, Procopius succeeded to the command of the Hussites, who were making war upon the Catholics with all the ardour of enthusiasm, exasperated to savage ferocity by the persecution they had undergone. He obtained very great successes, and spread terror throughout a large part of Germany. The emperor Sigismund sent deputies in 1428 to treat with him, and Procopius professed himself willing to make peace, and even to procure Sigismund's election to the throne of Bohemia, provided the religious grievances of his party should be redressed,

and the privileges of the country confirmed. An evasive answer being returned, arms were again resumed, and the Hussites laid waste Misnia with fire and sword, and extended their ravages to the surrounding countries. When the council of Basil was convoked in 1431, Procopius issued a circular letter in Latin, addressed to all the sovereigns and states, setting forth the complaints of his party, and proposing a disputation between the Catholic and Hussite doctors on scripture grounds. In reply to which a crusade was published against the Hussites, and an imperial army marched into Bohemia, which retaliated all the barbarities of that party, but being alarmed at the approach of the sectarian forces, fled with precipitation, leaving all their baggage and rich furniture as spoils to the enemy. In 1433, Procopius and some of the other leaders held several disputations without effect with the Catholics, and on their return hostilities were renewed. Procopius laid siege to Pilsen in Bohemia, but was obliged to raise it with great loss in 1434. He soon afterwards received a mortal wound, and died, leaving a name in his party for the greatness of his exploits, and the ferociousness of his manners. Some of his letters have been published in the last volume of the collection of ancient documents by Martenne and Durand. Univer. Hist. Moreri.

PROCOPIUS of Gaza, celebrated as a scripture commentator, flourished under the reign of the emperor Justin I. He presided with great reputation over a rhetorical school in Gaza of Palestine, whence he derived his surname. There is still extant an eloquent funeral oration in praise of his talents and virtues, pronounced by Choricus, his disciple and successor, when the infirmities of age obliged him to resign the rhetorical chair. This oration was published with a Latin version, by John Christian Wolf, and is inserted in the eighth volume of Fabricius's "Bibliotheca Græca." Procopius applied himself to the study of the orthodox fathers and commentators of the holy scriptures, and he himself compiled commentaries on various books of the bible, which are now frequently referred to, and which are executed with considerable judgment, as well as in a polished style, and have been useful to succeeding writers. Those given to the world consist of "Commentaria, seu, Εξηγητικαὶ σχολαὶ in Octateuchum," published at Zurich in 1555: "Scholia in Quatuor Libros Regum et duos Chronicorum," translated into Latin from the Greek by Lewis Lavater, and published in Greek and Latin at Leyden: and "Variorum in Esaiam Prophetam Commentariorum Epitome," 1580. It is not known whether he was the author of "Letters" written in an elegant style, in the collection of Greek Letters printed by Aldus, and ascribed to Procopius the sophist, or whether they were written by Procopius the historian. Moreri.

PROCREATION, PROCREATIO, the action of begetting and bringing forth children. See GENERATION.

PROCRIS, in *Botany*. See ELATOSTEMA.

PROCTALGIA, PROCTITIS, in *Medicine*, from *πρωκτος*, anus, and *αλγη*, pain, a term employed by Sauvages to denote the varieties of disease affecting the anus, of which he enumerates several species, including inflammation, cancer, fistula, intertrigo, rhagades, hæmorrhoids, prolapsus, &c. Nosol. Method. class vii. gen. 32. The various kinds of inflammation and abscesses affecting this part of the body, are treated of in the article FISTULA.

PROCTOR, PROCURATOR, a person commissioned to act as proxy, or delegate, in behalf of another. See PROCURATOR.

PROCTOR, *Procurator*, in the *Civil Law*, is an officer appointed

pointed to appear in court, and manage the causes of parties who will make use of his procuration.

Anciently every body was obliged to appear in person; and when the affair happened to be drawn out to a great length, they were allowed to create a proctor, or proxy, in their cause. See ATTORNEY.

But this was a favour only granted for a certain time, till towards the middle of the sixteenth century, when it was decreed, that all procuration should hold till revoked.

PROCTORS in the Commons, are persons skilled in the civil and ecclesiastical laws, who exhibit their proxies, and make themselves parties for their clients, to draw up acts and pleadings, produce witnesses, prepare causes for sentences, and attend the advocates with the proceedings. They are about fifty in number; are admitted by the archbishop's fiat; and wear black robes, and hoods lined with white furs.

By 3 Jac. c. 5. no recusant convict shall practise in the civil law as proctor; but this was repealed by 31 Geo. III. c. 32. which introduces a new oath to be taken by Roman Catholics practising the law: and by 5 Geo. II. c. 18. no proctor in any court shall be a justice of the peace, during such time as he shall continue in the business and practice of a proctor. Moreover, by 48 Geo. III. c. 149. every admission of any person to the office of proctor in any of the courts shall be upon a 20*l.* stamp. And every practising solicitor, attorney, notary, proctor, agent, or procurator, must take out a certificate annually; upon which there shall be charged, if he reside in the city of London or Westminster, or within the limits of the two-penny post, in England, or within the city or shire of Edinburgh, and shall have been admitted to his office three years, 10*l.*; if not so long, 5*l.* If he shall reside elsewhere, and have been admitted three years, 6*l.*; if not so long, 3*l.*

PROCTORS of the Clergy, are deputies, or representatives, chosen by the clergy of each diocese, two for each; and by the cathedral and collegiate churches, one for each, to sit in the lower house of convocation.

PROCTORS in the University, are two officers chosen from among the students, to see good orders and exercises daily performed there.

PROCTOR'S Creek, in Geography, a river of Virginia, which runs into James river, N. lat. 37° 24'. W. long. 77° 36'.

PROCTOR'S Point, a cape on the S. coast of the island of Antigua, E. of Falmouth harbour. N. lat. 17° 8'. W. long. 61° 29'.

PROCUBITORES, among the Romans, an appellation given to the velites, because, when the enemy was near, they always formed the outguard.

PROCULIANS and SABINIANS, in Antiquity, two famous sects which divided the Roman jurisprudence, forming two schools, and deriving their respective appellations from Proculus and Sabinus, their most celebrated teachers. The two sages of the law, Alcius Capito and Antistius Labeo, belonged to these schools, which thus maintained their inveterate conflict from the age of Augustus to that of Adrian.

PROCULS, in Geography, a town of Prussia; 10 miles S.S.E. of Memel.

PROCUMBENT LEAVES, in Botany, such leaves of plants as lie flat, or trailing on the ground.

PROCUPIA, in Geography, a town of European Turkey, in Servia, formerly the capital of Dardania; the see of two archbishops, one Rascian, the other Latin; 16 miles W. of Nissa. N. lat. 43° 30'. E. long. 21° 30'.

PROCURATION, or PROCURACY, an act or instru-

ment by which a person is empowered to treat, transact, receive, &c. in another's name, as if he himself were actually present.

When a man treats in behalf of another, the first thing is to examine his procuration or procuracy.

Procuration is now little used in this sense, except in the case of a person who collects the fruits of a benefice for another.

PROCURATION, in the Canon Law, is used for the repast, or entertainment, anciently given to church officers, or ordinaries, who came to visit in churches or monasteries, whether they were bishops, archdeacons, or visitors. Procuration was due to the pope's legate, and even to popes themselves, when they came into France; and the charge was comprised in the bulls then granted.

Complaints were frequently made to the pope of the excessive charges of the procurations of bishops and archdeacons; upon which they were prohibited by several councils and bulls.

That of Clement IV., mentioned in the Monasticon, is very express; in which that pope tells us, complaint had been made, that the archdeacon of Richmond, visiting the diocese, travelled with one hundred and three horses, twenty-one dogs, and three hawks; and did so grievously oppress a religious house with that vast equipage, that he caused the monks to spend in an hour as much as would have maintained them a long time.

PROCURATION is now used for a sum of money paid yearly by parish-priests to the bishop or archdeacon, in lieu of this entertainment, towards defraying the charge of their visitation.

These procurations were anciently so extravagant and oppressive, that several constitutions were framed by Langton and others to restrain them. The last constitution of this kind by Stratford, by putting it in the choice of the incumbent, whether he would entertain the visitor in provisions, or compound for it by a certain sum of money, was the cause of the custom generally prevailing afterwards, and which now universally obtains, of a fixed payment in money, instead of a procuration in meat, drink, provender, and other accommodation.

Procuration is due to the person visiting, of common right; and though originally due by reason of visitation only, yet the same may be due without actual visitation. The constitutions to which we have above referred, limit the payment, in provisions or money, to actual visitation, and warrant the denial of them when no visitation is held. Upon this a doubt has been raised, whether those archdeacons who are not permitted to visit, but are inhibited from doing it in the bishop's triennial visitation, have a right to require procurations for that year. Those who maintain the negative, found their opinion upon the express letter both of the ancient canon law, and of our own provincial constitutions. But others, who undertake to defend the rights of the archdeacons, allege, that though it might be reasonable that they lose their procurations, in case they neglect their office of visiting (which, by the way, was all that the ancient constitutions meant), yet that reason doth not hold, when they are restrained and inhibited from it; and that procurations are rated in the valuation of king Henry VIII., as part of the revenues of every archdeacon, who therefore pays a certain annual tenth for them; and the law could never intend the payment of the tenth part every year, if there had been any year in which he was not to receive the nine parts. These two arguments (says Dr. Gibson) are so strong in favour of the archidiaconal right,

right, the first in reason, and the second in law as well as reason, that it is needless to say more on that head.

Procurations are sueable only in the spiritual court, and are merely an ecclesiastical duty. (L. Raym. 450.) And they may be levied by sequestration, or other ecclesiastical process. (Gibf. 1546.) By the law of the spiritual court, forty years make a custom or prescription. (1 Peere W. 657. Str. 421.) If there be a parsonage and vicarage endowment, only one is to pay procurations, but custom, or the endowment if extant, directs which of them is chargeable. A chapel of ease shall be included in the procuration of the mother church. (Lind. 223. Deg. p. 2. c. 15.) Churches newly erected shall be rated to procurations, according to the proportion paid by the neighbouring churches. (Gibf. 976.) Donatives and free chapels pay no procurations to any ecclesiastical ordinary, because they are not visitable by any. Deg. p. 2. 15.

PROCURATION, in *Commerce, &c.* When exchange is made in the name and for the account of a third person, by virtue of full power, and authority given by him, commonly termed "procuration," such bills (of exchange) may be drawn, subscribed, indorsed, accepted, and negotiated, not in the name or for the account of the manager or transactor of any or all of these branches of remittances, but in the name and for the account of the person who authorised them. See *POWER of Attorney*, and *BILLS of Exchange*.

PROCURATOR, PROCTOR, or *Proxy*, a person who has a charge, or office committed to him, to act in behalf of another.

Thus the proxies of the lords in parliament, in our law-books, are called procurators.

The word is also used for a vicar, or lieutenant. Thus, in Petrus Blesensis, we read of a *procurator regni*.

Those who manage causes in Doctors' Commons, are also called procurators or proctors.

The bishops are sometimes called *procuratores ecclesiarum*, and the representatives sent by the clergy to convocation, *procuratores cleri*.

In our statutes, a person who gathers the fruits of a benefice for another, is particularly called a procurator, and the instrument empowering him to receive the same, is termed a procuracy.

PROCURATOR is also a kind of magistrate, in several cities of Italy, who takes care of the public interests. There are procurators of St. Mark at Venice, at Genoa, &c.

Originally there was but one procurator of St. Mark at Venice: in 1442 the number was augmented to nine, when the senate made a decree, appointing, that, for the future, none should be admitted to the dignity, but after the death of some of the nine. But, in the necessities of the republic, the number was afterwards enlarged to forty; though of these there are only nine that bear the title of procurators, and whose place is regularly filled. They are administrators of the church of St. Mark, and of the revenues attached to it, the patrons of orphans, and the executors of testaments.

This office receives more lustre from the merit of those who discharge it, than from its authority. They are clothed in black, or violet, with ducal sleeves.

PROCURATOR *Monasterii*, anciently was the advocate of a religious house, who was to solicit the interest, and plead the causes, of the society. See *ADVOCATE* and *ADVOWEE*.

PROCURATORES *Ecclesie Parochialis*, are the churchwardens, whose office is to act as proxies and representatives of the church.

PROCURATORES, in the *Roman Law*, were such lawyers as assisted the plaintiff in proving, or the defendant in clear-

ing himself from the matter of fact. These, as well as the patron (see *PATRON* and *ADVOCATE*), were selected out of the ablest lawyers, and had their names entered in the matriculation book of the forum.

This was one condition requisite to give them the liberty of pleading; the other was the being retained by one party, or receiving a fee, which they termed *mandatum*.

PROCURATORES *Cesaris*, among the Romans, were officers, often mentioned by Tacitus and Suetonius, who were sent by the emperors into every province, to receive and regulate the public revenue, and to dispose of it at the emperor's command. The procurator of Judæa was invested with all the authority proper to the *Proconsul*, which see; and, as the learned bishop Pearson observes on the Creed, art. 4, even with the power of life and death.

PROCYON, in *Astronomy*, a fixed star of the second magnitude, in Canis minor.

PROD, in *Rural Economy*, a term signifying a short spike. It also signifies a goad for driving oxen, and likewise a sharpened piece of stick for keeping thatch upon stacks, buildings, &c.

PRODANO, in *Geography*, an island in the Mediterranean, near the coast of Morea, anciently called "Sphacteria;" 36 miles S.S.E. of Zante. N. lat. 37° 15'. E. long. 21° 24'.

PRODEGAS, a town of South America, in the province of Quito; 38 miles N.N.E. of Guayaquil.

PRODES HOMMES, *q. d.* wise or discrete men, in our *Ancient Customs*, a title given to the barons, and other military tenants, who were called to the king's council, and were to give advice according to the best of their prudence and knowledge.

PRODICTATOR, among the Romans, a magistrate who had the power, and did the office of a dictator.

The Romans sometimes created a prodicator, in cases where they could not have a dictator. Fabius Maximus was prodicator.

PRODIGALITY is a term, the meaning and application of which are well known. We shall, therefore, under this head, only take occasion to observe, that, by the Roman law, if a man by notorious prodigality was in danger of wasting his estate, he was looked upon as *non compos*, and committed to the care of curators, or tutors, by the prætor. And by the laws of Solon, such prodigals were branded with perpetual infamy.

PRODIGY, in *Mythological and Fabulous History*, an event which really or apparently deviated from the ordinary course of nature, and which credulity and superstition interpreted as an omen or presage of good or ill fortune. (See *PRESAGE*.) The history of paganism abounds with occurrences of this kind, and with an ample account of ceremonies which they were the occasion of introducing. An accidental, and sometimes a merely imaginary coincidence between the event, deemed a prodigy, and the circumstances that followed it, led the credulous to connect them together, and to consider the former as the cause, or at least as the presage of the other. The historians of antiquity, such as Livy, Dionysius Halicarnassensis, Pliny, Valerius Maximus, &c. &c. have recorded various occurrences of this nature, and the political uses to which they were applied by the crafty and designing. The prodigies treated of by the ancients, are reduced by Bannier into two classes. In the first, he comprehends those reputed miracles of paganism, which have been considered as inexplicable, without having recourse to a supernatural cause. Such have been reckoned the story of the Dii Penates, or household gods, related by Dionysius of Halicarnassus (lib. i.); that of Jupiter Terminalis,

minalis, which it was impossible to force from its place at the time of building the Capitol; the adventure of Accius Nævius, who cut, as it is said, a flint stone with a razor, to convince the incredulity of a king of Rome, who slighted the augurs and the Tuscan divination; that of the vestal virgin Æmilia, who drew water in a sieve; that of another vestal, who with her girdle drew to shore a ship which had been stranded; and, to mention no more of a similar kind, for they are numerous, and all equally incredible, that of the shield which fell from heaven, under the reign of Numa Pompilius. The prodigies of the second class were purely natural events, but being less frequent, and seeming to be deviations from the ordinary course of nature, they were ascribed to a superior cause by the credulous and superstitious. Such were various meteors, the appearances of fire and light in the night, monstrous births of men or of animals, showers of blood, of stones, or of ashes, and many other things, which were natural, but the causes of which were not investigated or not understood. All these prodigies have diminished in number, as a spirit of inquiry and knowledge have prevailed, and those which have not been explained have had secret causes, which the most sagacious and diligent inquirers have not been able to explore. To the number of such incredible prodigies, some writers have referred Constantine's luminous trophy of the cross, which he observed above the meridian sun, and inscribed with the following words, BY THIS, CONQUER, and which the emperor either thought he saw, under the delusion of his fancy and senses, or said he saw, to answer his own political purposes. The latter alternative is adopted by Mr. Gibbon. *Hist. of Rome*, vol. iii. See CROSS.

PRODROMUS, *προδρομος*, literally denotes a fore-runner, an harbinger. Hence,

PRODROMUS *Morbis*, among *Physicians*, is used for a lesser disease, which precedes, or foreruns, a greater.

Thus, a straightness of the breast is a prodromus of a consumption, &c. A vertigo is sometimes a prodromus of an apoplexy.

PRODUCE, NET. See NET *Produce*.

PRODUCING, in *Geometry*, denotes the continuing a right line, or drawing it out farther, till it have any assigned length.

PRODUCT, in *Arithmetic* and *Geometry*, the factum of two numbers, or the quantity arising from, or produced by, the multiplication of two or more numbers, lines, &c. into one another.

Thus, if 6 be multiplied by 8, the product is 48.

In lines it is always (and sometimes in numbers) called the rectangle, between the two lines multiplied by one another.

PRODUCTION. See GENERATION, and PROPAGATION.

PRODUCTION, in *Anatomy*, a continuation or process.

PROZELDEN, or PROCELDEN, in *Geography*, a town of Germany, in Hesse-Darmstadt; seven miles E. of Miltenberg.

PROEDRI, *προεδροι*, among the Athenians, magistrates whose business it was to propose to the people the things they were to deliberate upon and determine at every assembly, after which their offices expired.

They were so called from the privilege they enjoyed, of always having the first seats at assemblies. See EPISTATES.

PROEM, PROEMIUM, a term anciently used for preface.

PROEMPTOSIS, in *Astronomy*, that which makes the new moons appear a day later, by means of the lunar equa-

tion, than they would do without that equation. See METEMPTOSIS.

PROENÇA a *Velho*, in *Geography*, a town of Portugal, in the province of Beira; 17 miles N.E. of Castel-Branco.

PROEROSIA, in *Mythology*, a festival of Ceres, instituted to her honour in Attica, and so called because it was celebrated before sowing and tilling: and the goddess herself was called by the same name.

PROFANATION, in *Religion*, the doing of something which is disrespectful to holy or sacred things.

PROFANATION of the *Lord's day*. See SUNDAY.

PROFANE, a term used in opposition to *holy*, *sacred*.

Except churches, and church-yards, all places are esteemed profane. By the canon law, a sacred chalice, or cup, becomes profane, by giving it a blow with a hammer.

PROFANE is also applied, in general, to all persons who have not the sacred character; and all things which do not belong to the service of religion.

In this sense, Xenophon, Seneca, &c. are profane authors. The heathen priests, pontiffs, &c. also pass with us for profane.

PROFANENESS denotes a disrespect paid to the name of God, and to things and persons consecrated to him. By statute 19 Geo. II. cap. 21. which repeals all former ones, every labourer, sailor, or soldier, shall forfeit 1s. for every profane oath or curse; every other person under the degree of a gentleman, 2s.; and every gentleman, or person of superior rank, 5s. to the poor of the parish; and on a second conviction, double; and for every subsequent conviction, treble the sum first forfeited, with all charges of conviction; and in default of payment shall be sent to the house of correction for ten days. Any justice of the peace may convict upon his own hearing, or the testimony of one witness; and any constable or peace officer, upon his own hearing, may secure any offender, and carry him before a justice, and there convict him. If the justice omits his duty, he forfeits 5l. and the constable 40s. And the act is to be read in all parish churches and public chapels, the Sunday after every quarter day, on pain of 5l. to be levied by warrant from any justice. By 22 Geo. II. c. 33. art. 2. all flag-officers, and all persons in or belonging to his majesty's ships or vessels of war, being guilty of profane oaths, cursings, exclamations, or other scandalous actions, in derogation of God's honour, and corruption of good manners, shall incur such punishment as a court-martial shall think fit to impose, and as the nature and degree of their offence shall deserve. Besides this punishment for taking God's name in vain in common discourse, it is enacted by stat. 3 Jac. I. cap. 21. that if in any stage-play, interlude, or show, the name of the Holy Trinity, or any of the persons therein, be jestingly or profanely used, the offender shall forfeit 10l. one moiety to the king, and the other to the informer. See BLASPHEMY and TOLERATION.

PROFECTITIOUS. See ADVENTITIOUS, and GOODS.

PROFER, formed of the French *proferer*, to produce, in *Law*, the time appointed for the accounts of sheriffs, and other officers, to be given into the exchequer; which, by stat. 51 Hen. III. is to be twice in the year.

PROFER is also used for an offer, or endeavour to proceed in an action, by a person concerned so to do.

Trinity term shall begin the Monday next after Trinity Sunday, whenever it shall happen to fall, for the keeping of the essoigns, profers, returns, and other ceremonies, heretofore in use. Stat. an. 32 Hen. VIII.

PROFER the half mark. See HALF-mark.

PROFERT in *Curia*, in *Law*, is where the plaintiff in

an action declares upon a deed, or the defendant pleads a deed, he must do it with a *profert in curia*, to the end that the other party may at his own charges have a copy of it, and until that time he is not obliged to answer it.

PROFESSED MONK, or *Nun*, one who, having made the vow, is admitted of a religious order.

In this sense the word is used in opposition to novice.

PROFESSIO VIDUITATIS. See VIDUITATIS.

PROFESSION, PROFESSIO, in a monastic sense, the entering into a religious order; or an action whereby a person offers himself to God, by a vow of observing three things: *viz.* obedience, chastity, and poverty; which he promises inviolably to maintain.

This is called *sanctæ religionis professio*, and the person, a *religious professed*.

Persons are not admitted to make profession till after a year of probation.

PROFESSOR, in the *Universities*, a person who teaches or lectures, publicly, some art or science, in a chair established for that purpose.

The professors, in foreign universities, teach the arts, and have their classes of pupils; those in our universities only read public lectures in term-time.

Of professors we have a great number, some denominated from the arts they profess, as *casuistical* professor, *Hebrew* professor, *physic* professor, *divinity* professor, &c. Others, from those who founded the professorship, or assigned a revenue for the support of the professor, as the *Savilian* professors of astronomy and geometry, the *Lucaſian* professor of mathematics, *Margaret* professor of divinity, &c.

PROFESSORS, *Regius*. See REGIUS.

PROFICISCENDUM, *Capias Conductos ad proficiscendum*. See CAPIAS.

PROFILE, in *Architecture*, the figure or draught of a building, fortification, or the like; in which are expressed the several heights, widths, and thicknesses, such as they would appear, were the building cut down perpendicularly from the roof to the foundation.

Whence the profile is also called the *section*, sometimes the *orthographical section*: and, by Vitruvius, also the *ſciagraphy*.

Profile, in this sense, amounts to the same with *elevation*; and stands opposed to a plan, or *ichnography*.

PROFILE is also used for the contour, or outline of a figure, building, member of architecture, or the like; as a base, a cornice, &c.

Hence *profiling* is sometimes used for designing, or describing the member with rule, compass, &c.

PROFILE of a *Fortification*. See FORTIFICATION.

PROFILE, in *Sculpture* and *Painting*. A head, a portrait, &c. are said to be in profile, when they are represented sideways, or in a side-view.

As, when in portrait, there is but one side of the face, one eye, one cheek, &c. shewn, and nothing of the other. On almost all medals the faces are represented in profile.

PROFIT of *Stock*, in *Political Economy*, is that which is produced by means of a capital above its value. Capitals are in general consumed or employed, with the view to gain by their employment. In the latter case, the capital is either lent to another individual, who consumes it, and restores it to the owner out of some other source, with profit; or the capitalist employs his stock in the payment of such labour as produces more than the value of his capital. The first of these two ways of employing capital, though it may be beneficial to the capitalist, produces no advantage to the country. The second is that which yields the most

regular and highest profits. A capital may be considered as a machine, by the use of which something is to be gained. The capitalist is the owner of the machine, and he who uses it for the purpose of producing something useful with it, is, as we have seen in the article PRICE, called the undertaker. The former has nothing to do but to lend it; the latter regulates its operations, and disposes of its produce. When the functions of capitalist, undertaker, and labourer, exist in the same person, the whole produce of his stock and labour belongs to that individual: in general they are different persons. In either case we must distinguish the shares of profit enjoyed by the capitalist, undertaker, and labourers in their different capacities. The labourer returns for his wages something of greater value, and it is the surplus of this value which constitutes the profit of stock. The capital is restored to the capitalist, but the surplus or profit is divided between him and the undertaker. What the former receives for the mere act of lending his capital is called interest, what the latter gets for the management or enterprize, is called the profit of the undertaker. This profit is a reward, not only for his skill and trouble in the management of the undertaking, but also for the risk connected with the same. The rewards of an undertaker must always be more considerable than those of a common labourer, for otherwise he would prefer being a labourer, whose occupation is not attended with any hazard. But independently of this, the nature of his business entitles him to a higher reward. Moreover, in those who undertake the employment of another person's capital, certain requisites are looked for. They ought to be possessed of property of some kind or other, as a security to the capitalist, or their moral qualities must inspire great confidence, and either the one or the other, or both conjoined, must be in proportion to the amount of the capitals which their enterprize requires. They must be men of talent, of judgment, and industry. Different undertakings require those qualities in different degrees, which cause a difference in their profits. Hence it is extremely difficult to ascertain the principles by which the profit of the undertaker is regulated. At any rate, the profit of stock ought to be greater than the usual rate of interest; so that the surplus above the interest ought to be sufficient to enable the undertaker to live according to his rank of life, and save something to accumulate a capital for himself.

The market price of this profit follows the general rule of all market prices. As long as skilful undertakers are scarce, their profits are great, but when a country abounds with clever men in that line, their profits are small. When the profits of the undertakers are generally high, the rate of interest is also high. In that case the class of undertakers is increasing; they strive to deprive each other of capital, by offering higher interest. Where the profits are small, the rate of interest is necessarily low. *Wealth of Nations*. *Boileau's Political Economy*.

PROFITS, *Pernor of*. See PERNOR.

PROFLUVIA, in *Medicine*, diseases accompanied with fever, and with increased excretion of some fluid, naturally not bloody: whence the order of profluvia, in Dr. Cullen's arrangement of diseases, includes only two genera; the *cattarrh*, or morbid excretion of mucus from the nostrils, throat, and bronchial passages; and *dysentery*, with a morbid excretion of mucus, with or without blood, from the bowels. See his *Nosol. Method. class 1. ord. v.*

PROFLUVIUM, any kind of flux, or copious and liquid evacuation. Thus, *profluvium veneris* signifies a diarrhœa. Dr. Cullen, after Vogel, has used the word in the plural, to denote an order of febrile diseases. See the preceding article.

PROFLUVIUM *Mensium*, a profuse discharge of the menstrual flux. See **MENSES**.

PROFUNDUS, in *Anatomy*, a name given by Albinus, Hunaud, and others, to a muscle of the wrist, generally known by the name of the perforans. These authors called, in the same manner, the perforatus of others the sublimis.

PROGAL-INSECT, an animal nearly approaching to the gall-insect class, but differing from it in some respects, and called by this name from its resemblance to those creatures; as the creatures somewhat approaching to the scarab or beetle class, but not regularly of it, are called *pro-scarabs*.

Animals of this class pass a great part of their lives in the same manner with the gall-insects, fastened to the bark of a tree, and there remain motionless: some of them also, in the manner of the gall-insects, cover their young brood with their bodies; but they are easily distinguishable as animals, in all the stages of their lives, and in that they differ from the others. The annular depressions of their bodies may in all their states be distinguished, especially with the help of a magnifying glass; whereas those of the gall-insects all disappear as they grow towards their utmost bulk.

If the gall-insects are worthy of observation, on account of the great value of one species of them, the kermes; the progal-insects are at least equally so on the same account, since the cochineal belongs to this class.

The most common and observable species of the progal-insect class, is that of the elm.

PROGNOSIS, in *Medicine*, from *πρῶ*, before, and *γινωσκω*, I know, the foretelling the event of any disease, or the approach of disease.

There is no part of the science of medicine, which it is so difficult to teach by precept as the principles of prognosis; the application of which, at least, must be learned exclusively from experience of the ordinary progress and tendency of certain combinations of symptoms. The very young practitioner, and above all the pretender to medical knowledge, are, therefore, usually very deficient in this species of skill: with this difference, that the former daily multiplies his knowledge by observation; while the latter, being devoid of principles, is incapable of improvement, unless he possess an unusual share of sagacity and attention. For the power of anticipating the course of the symptoms of disease, must be founded on a knowledge of the nature of those symptoms; that is, of the actual state of the different organs of the body which they indicate. This, however, implies also that degree of knowledge of the structure and functions of the living body, which belong to anatomy and physiology, without which it is impossible that any clear indications can be inferred from certain symptoms: the structure of the machine, and its healthy mode of action, must be understood, before we can either appreciate or comprehend the derangements of its parts. It is upon a clear estimation, then, of the extent of mischief already done in any important organ, or likely to ensue from the violence of the action going on, (which must be estimated from the symptoms,) that a sound prognosis can alone be founded: in other words, he who, from previous knowledge of the nature of the living body, and from greater opportunities, or what is still more important, from greater attention and accuracy in the discrimination of symptoms, acquaints himself most thoroughly with the actual nature of the disease, will be the best able, not only to cure the disease, but to anticipate its changes and termination.

The danger or safety indicated by certain symptoms will be exactly in the ratio of the importance of the organs dis-

eased, and of the degree of the morbid derangement which is actually produced, or the violence of the action which is going on in them, the tendency of which is to produce organic derangement. The affections of particular organs are distinguished, partly by the seat of pain, tumour, change of colour, &c. where these exist, but principally by the particular functions which are disturbed. For as physiology teaches us, that certain functions are performed by particular organs; so, where we have no opportunity, like the common mechanic, of examining the organs themselves, we must infer their derangement from the excess, defect, or unnatural performance of these functions. The three great organs, the functions of which are immediately necessary to the continuance of life, are the brain, the heart, and the lungs; for the functions of the nervous system, the circulation, and respiration, cannot be long suspended, without occasioning death; and death, in all cases, takes place from the cessation of one or other of these three functions. (See **DEATH**.) It is chiefly, therefore, from the violent disturbance of one or more of these functions, that the prognosis in acute diseases becomes unfavourable. In chronic diseases, however, where no organ immediately necessary to life may be affected, the prognosis may still be unfavourable, in consequence of the serious derangement of less vital, though important, organs, which are absolutely necessary to the constitution, and contribute to some of the purposes of life; as in organic diseases of the stomach, liver, spleen, mesentery, kidneys, bladder, uterus, &c. and even of the bones, muscles, and ligaments.

As we have detailed, under the head of each disease respectively, the symptoms which afford a favourable or unfavourable prognosis, it will not be necessary to enter at any length here into the particular prognostics, which the various circumstances of disease may give rise to. We shall, therefore, exemplify very briefly the mode in which the prognostics are deduced in violent diseases, from indications relative to the three great functions just mentioned.

In all febrile diseases, great disturbance of the functions of the brain, or common sensorium, is indicative of danger. The existence of this disturbance is denoted by aberration of the *intellectual functions*; as by delirium, whether furious and noisy, or low and muttering; by stupor, loss of memory, and incoherence of thought. It is denoted also by morbid changes in the *organs of sense*; as by extreme sensibility to light, or by partial or total blindness; by the appearance of black spots, spectra, sparks of light, &c. floating before the eyes; by acuteness of hearing, or by deafness; by perversion or loss of taste, and of feeling as to external objects; by coma, or by great watchfulness. It is indicated, moreover, by a disordered state of volition and *muscular motions*; as by spasms, subfultus of the tendons, and convulsions; by squinting of the eyes, distortions of the countenance, dilatation of the pupils; and by prostration, or a preternatural exertion, of the muscular strength. These are direct indications of the disordered state of the brain; the excess or over-acuteness of the faculties implying inflammatory excitement, the defect or abolition of them denoting pressure, oppression, or distension of the organ; the latter of which is often the consequence of the former state. These conditions of the brain can scarcely occur, without producing other indirect indications in distant organs, which are necessarily influenced through the nervous system. Whence the symptoms just enumerated are commonly accompanied by various morbid states of the circulation, as indicated by the pulse: thus in the case of high excitement, the pulse is frequent, hard, strong, and sharp; and in the oppressed state of the brain, it is often preternaturally

naturally flow, irregular, and intermitting. The respiration is also disordered, in the latter case, from the impaired influence of the brain on the muscles of the chest, and becomes slow, irregular, and stertorous. And the alimentary canal, also, suffers from the same sympathy, the stomach sometimes rejecting its contents by vomiting, whilst the bowels become exceedingly torpid. According to the greater violence and combination of such symptoms, or the mildness or absolute absence of all or many of them, the prognosis, as to the state of the brain, will necessarily be more or less favourable.

The lungs, however, are often affected primarily and idiopathically, by inflammation, tubercle, dropsy of the chest, obstructions in the trachea and air-tubes, &c.; when the prognosis will be principally collected from the disordered state of the functions of respiration. This function may be performed with various degrees of facility, or with various noises, as coughing, wheezing, rattling, piping, &c.; it may be performed more or less freely in different positions, as on the back, on one side, or only in the erect posture, when it is called orthopnœa; it may be accompanied with much discharge by expectoration, as of mucus, pus, blood, sanies, &c.; or with pain in different parts of the chest; or with lividity of the face. And from these symptoms, together with other concomitant circumstances, as the absence or presence of acute fever, or of hectic fever, the state of fulness or emaciation, the long or short duration of the disease, the age and constitution of the patient, it will be decided whether the disease be pleurisy, peripneumony, phthisis, croup, hydrothorax, asthma, &c.; and the degree of danger, or the chance of recovery, will thus be estimated.

The circulation is much more frequently affected secondarily, than idiopathically, unless the local inflammations are deemed affections of the circulation. Inflammation is dangerous, in proportion to the importance of the organ which it attacks, and to the violence and rapidity of its progress. Two of its terminations, *gangrene* and *suppuration*, are extremely dangerous, when they take place in internal organs; and the prognosis is more or less favourable, according as the tendency to these is more or less manifest. Extreme violence of pain, and a long continuance of it, with constant fever, betoken the probability that suppuration will ensue; and when the pain, after such a continuance, begins to remit, while rigors or shiverings come on, it may be concluded that suppuration is begun. A sudden cessation of all pain, without any adequate cause, affords a most unfavourable prognosis in cases of acute inflammation, especially in the bowels, and other membranous parts; for it is commonly the signal of commencing *mortification*; and though the patient expresses himself as perfectly comfortable, the sinking pulse will inform the physician that a few hours will probably terminate his life.

In chronic diseases, the prognosis is often less easily laid down, in consequence of the slow progress of the symptoms; but our principal guide, in forming it, will be an attention to the state of the functions, as leading to the seat of the disease. See DISEASE.

PROGNOSTICS of the Weather. See WEATHER.

PROGRAMMA, anciently denoted a letter sealed with the king's seal.

PROGRAMMA is also a college term, signifying a billet, or advertisement, posted up, or given into the hand, by way of invitation to an oration, or other college ceremony: containing the argument, or so much as is necessary for the understanding of it. Programmas are sent to invite people to assist at declamations, dramatic performances, &c.

PROGRESSIO HARMONICA, Progression in harmonics, is a continued proportion prolonged beyond three terms. (See PROPORTION.) The succession of equal intervals is in all progression: as the triple progression gives perfect fifths, and equal harmony. See PARTICIPATION.

PROGRESSION, PROGRESSIO, an orderly advancing, or going forward, in the same manner, course, tenor, &c.

PROGRESSION, in Mathematics, is either arithmetical, or geometrical.

PROGRESSION, Arithmetical, is a series of quantities equidistant from each other; i. e. either increasing or decreasing, by the same common interval, or difference.

Thus, 3, 6, 9, 12, 15, 18, &c. make an arithmetical progression; because increasing, or differing equally by 3: thus also 25, 20, 15, 10, and 5, are in arithmetical progression, decreasing by a common difference, 5.

In every arithmetical progression, whether increasing or decreasing, the sum of the first and last term is equal to the sum of any two intermediate terms equidistant from the extremes; as also, if the number of terms be uneven, to the double of the middle term. For instance:

$$\begin{array}{ccccccc} 3, & 6, & 9, & 12, & 15, & 18, & 21 \\ & & & 12, & 9, & 6, & 3 \\ \hline & & & 24, & 24, & 24, & 24 \end{array}$$

Hence, 1. We find the sum of any arithmetical progression, by multiplying the sum of the first and last term by half the number of terms. Thus let a represent the first term, x the last, and n the number of terms; and we

shall have $\frac{a+x}{2} \times n = s$, or the sum of all the terms.

2. Having, therefore, the first term, the difference, and the number of terms given, the sum of the progression is had by multiplying the first term by the number of terms; and to the product adding the product arising from the difference multiplied into the semi-difference of the number of terms from the square of that same number.

Let b be the common difference; and since $x = a + n - 1$ $\times b$, and $\frac{a+x}{2} \times n = s$, we shall have, merely by sub-

stitution, $\frac{2a + nb - b}{2} \times n = s$, i. e. $an + \frac{n^2 - n}{2} \times b = s$.

Thus suppose the first term 3, the number of terms 7, and the difference 3; the product of 3 and 7 = 21, being added to the product 63, of the difference 3 multiplied into the semi-difference of the number of terms 7, from the square thereof 49, which is 21, gives 84, the sum of the progression.

3. The number of terms lessened by one, being multiplied by the common difference, and the first term added to the product, the sum is the last term, i. e. $n - 1 \times b + a = x$. Thus, in the progression of 52 places, where the difference is 3, and the first term 5, 51 being multiplied by 3, produces 153; to which adding 5, the sum 158 is the last term required.

4. If the progression begin with 0, the sum of all the terms is equal to half the product of the last term multiplied by the number of terms, i. e. $\frac{x}{2} \times n$ becomes in this

case $\frac{nx}{2}$.

Whence it follows, that the sum of a progression beginning from 0, is subduple the sum of so many terms, all equal to the greatest.

PROGRESSION, *Geometrical*, is a series of quantities increasing or decreasing, in the same ratio, or proportion; or it is a series of quantities that are continually proportional; or which increase by one common multiplier, or decrease by one common divisor: which common multiplier or divisor is called the common ratio. Thus, $a, ar, ar^2,$

$ar^3, ar^4, \&c.$ or $a, \frac{a}{r}, \frac{a}{r^2}, \frac{a}{r^3}, \frac{a}{r^4}, \&c.$ and in numbers, 1, 2, 4, 8, 16, 32, 64, &c. or 729, 243, 81, 27, 9, 3, 1, make a geometrical progression.

1. In every geometrical progression, the product of the two extreme terms is equal to the product of the two intermediate terms equidistant from the extremes; as also, if the number of terms be uneven, to the square of the middle term. For example: let $a, ar, ar^2, ar^3, \&c.$ continued

to y , the last term, be such a series; then $y, \frac{y}{r}, \frac{y}{r^2}, \frac{y}{r^3},$

will be the four last terms; and $a \times y = ar \times \frac{y}{r} = ar^2$

$\times \frac{y}{r^2} = ar^3 \times \frac{y}{r^3}, \&c.$ And, in numbers,

3,	6,	12,	24,	48,	96
			12,	6,	3
288, 288, 288					

2. If the difference of the first and last term of a geometrical progression be divided by a number less by unit than the denominator of the ratio, the quotient will be the sum of all the terms except the greatest: hence, by adding the greatest, we have the sum of the whole progression.

In the preceding series, $\frac{y-a}{r-1} + y = \frac{y-a+yr-a}{r-1} = \frac{yr-a}{r-1} = s.$ For the sum of a series of geometrical

proportionals, wanting the first term, or the sum of all the consequents, is equal to the sum of all but the last term, or the sum of all the antecedents, multiplied by the common

ratio. Thus, $ar + ar^2 + ar^3, \&c. + \frac{y}{r^2} + \frac{y}{r^3} + \frac{y}{r^4}$

$+ y = r \times a + ar + ar^2, \&c. + \frac{y}{r^4} + \frac{y}{r^3} + \frac{y}{r^2} + \frac{y}{r^1}.$

Therefore $s - a = s - y \times r = sr - yr$; or, $sr - s$

$(s \times r - 1) = yr - a$; and $s = \frac{yr-a}{r-1}.$ If it be a de-

creasing series, whose sum is to be found, as of $y + \frac{y}{r} +$

$\frac{y}{r^2} + \frac{y}{r^3}, \&c. + ar^3 + ar^2 + ar + a$; and the number

of terms be supposed infinite, then a , the last term, will be equal to nothing; consequently the sum of such a series $s =$

$\frac{yr}{r-1}$; which is a finite sum, though the number of terms

be infinite.

Thus $1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16}, \&c. = \frac{1 \times 2}{2 - 1} = 2.$

In a progression of five terms, beginning with 3, and the denominator being likewise 3, the greatest term will be 243. If, then, the difference of the first and last term 240 be divided by 2, a number less by 1 than the denominator, the quotient 120, added to 243, gives 363, the sum of the progression.

Hence, 3. The first or least term of a progression is to the sum of the progression, as the denominator lessened by 1, to its power likewise lessened by 1; the exponent of which power is equal to the number of terms. For, if the number of terms be n , the exponent of r in the last term will be $n - 1$. Therefore $y = ar^{n-1}$; and $yr = ar^{n-1+1} = ar^n$; and $s = \left(\frac{yr-a}{r-1}\right) \frac{ar^n-a}{r-1}$; consequently $s \times r - 1 = a \times r^{n-1}$, and $a : s :: r - 1 : r^n - 1.$

Thus, supposing the first term 1, the denominator 2, and the number of terms 8, the sum will be 255.

4. Hence, also, the difference between the last term and the sum, is to the difference between the first term and the sum, as unity to the denominator. Wherefore, if the difference between the first term and the sum be divided by the difference between the sum and the last term, the quotient is the denominator.

From art. 2. it appears, that $s - a = s - y \times r$; therefore $s - y : s - a :: 1 : r$, or $r = \frac{s-a}{s-y}.$

As a right line, or figure, may increase continually, and never amount to a given line or area; so there are progressions of fractions which may be continued at pleasure, and yet the sum of the terms be always less than a given number. If the difference between their sum and this number decrease in such a manner, that by continuing the progression it may become less than any fraction, how small soever, that can be assigned, this number is the limit of the sum of the progression, and is what is understood by the value of the progression, when it is supposed to be continued infinitely. These limits are analogous to the limits of figures, and they mutually assist each other. The areas of figures can, in many cases, be no otherwise expressed than by such progressions; and when the limits of figures are known, they may sometimes be advantageously applied for approximating to the sums of certain progressions.

Thus, for instance, let the terms of any progression be represented by the perpendiculars AF, BE, CK, HL, &c. standing at a given distance on the base AD (*Plate XIII. Analysis, fig. 5.*); and let PN be any ordinate of the curve FNE passing over the extremities of those perpendiculars. Suppose AP to be produced; then according as the area APMF has a limit to which it may approach continually, but never exceed, or may be produced till it exceed any given space; there will also be a limit of the sum of the progression, or it may be continued till it exceed any given number. For supposing the rectangles FB, EC, KH, LI, &c. completed, the area APNF will always be less than the sum of those rectangles, but greater than their sum after the first; therefore the area APNF, and the sum of those rectangles, either both have limits or both have none. The same is to be said of the sum of the ordinates AF, BE, CK, HL, &c. and of the sum of the terms of progression represented by them. If the curve FNE, for example, be the common hyperbola, b its centre, bP the asymptote, and AB equal

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equal to bA ; if AF represent unity, the series of ordinates will represent the progression $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \frac{1}{6}, \&c.$ which may therefore be continued till it exceed any given number, as the hyperbolic area may be produced till it exceed any given space. But if PNe be an hyperbola of any higher order, so that the ordinate PN be reciprocally as any power of the base bP , whose exponent is greater than unity, the area $APNF$, and the sum of the progression represented by the series of ordinates, will have limits. Hence there is always a limit of the sum of the fractions that have unity for their common numerator; and the squares, cubes, or any other powers of the numbers $1, 2, 3, 4, \&c.$ whose exponents exceeded unity for their successive denominators.

When the area $APNF$ has a limit, we may not only conclude that the sum of the progression, represented by the ordinates, has a limit; but when the former limit is known, we may by it approximate to the value of the latter; and *vice versa*, when the limit of the progression is given, the limit of the area may be found.

Progressions of fractions may be found at pleasure, that shall have assignable numbers equal to the limit of the sum of the terms. Thus a series or progression of any number of quantities continually decreasing being given, their successive differences form a new series of terms, the sum of which from the beginning is always equal to the excess of the first term of the first series above its last term. For instance, if $A, B, C, D, \&c.$ be the terms of the first series, it is manifest, that the sum of the difference of A and B , B and C , C and D , D and E , is the excess of A above E . If the terms of the first series decrease in such a manner, that by continuing the progression they may become less than any quantity that can be assigned, then the first term of the first series is the limit of the sum of the second series. In like manner, the difference of the alternate terms of the first series, as of A and C , B and D , C and E , $\&c.$ form a new progression of terms, the sum of any number of which is equal to the excess of the sum of A and B , the first and second term of the series, above the sum of the last and penultimate terms; and the sum of A and B is the limit of the sum of the new series. In general, if a progression is formed by taking the difference of the first term A and the term whose place in the series is expressed by any number n ; of the second term B , and that whose place is $n + 1$; of the third term C , and that whose place is $n + 2$, and so on; then will the limit of the sum of this new progression be equal to the sum of the terms $A, B, C, D, \&c.$ which precede that term whose place is expressed by n . In this manner progressions may be found at pleasure, which may be continued without end, and have given numbers for the limits of their sums.

For example, let the first series be $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \&c.$ the successive differences of the terms of which are $\frac{1}{2}, \frac{1}{6}, \frac{1}{12}, \frac{1}{20}, \&c.$ and the limit of the sum of this progression will therefore be 1 . If we multiply each term of this last series by 2 , that the first term may be unity, we shall have $1, \frac{1}{2}, \frac{1}{6}, \frac{1}{12}, \&c.$ the denominators of which are the triangular numbers, unity being the common numerator, and the limit of the sum of this progression is 2 . The successive difference of the terms of this latter series being each multiplied by $\frac{1}{2}$, that the term of the new series may be unity, give $1, \frac{1}{4}, \frac{1}{16}, \frac{1}{36}, \&c.$ which have the pyramidal numbers for their successive denominators; and the limit of the sum of this progression is $\frac{1}{2}$. In the same manner, the limit of the sum of the fractions having unity for their common numerator, and the figurate numbers of any order de-

nominated by m for their successive denominators, is found to be $\frac{m-1}{m-2}$.

The same series $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{5}, \&c.$ being again assumed, the difference of the alternate terms are $\frac{1}{3}, \frac{1}{8}, \frac{1}{15}, \frac{1}{24}, \&c.$ the limit of the sum of which progression is $\frac{1}{2}$. Dividing each term by 2 , the limit of the sum of $\frac{1}{2}, \frac{1}{6}, \frac{1}{12}, \frac{1}{20}, \&c.$ is $\frac{1}{3}$. If we take the differences of the first term, and that whose place is m , the second term, and that whose place is $m + 1$, $\&c.$ the common numerator of those differences will be $m - 1$; and their successive denominators, the product of $1 \times m, 2 \times m + 1, 3 \times m + 2$, and the limit of the sum of this progression is the sum of as many terms $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4}, \&c.$ as there are units in $m - 1$. Now if each term of the new progression be divided by $m - 1$, that unity may be the common numera-

tor, the terms $\frac{1}{m}, \frac{1}{2 \times m + 2}, \frac{1}{3 \times m + 2}, \&c.$ will arise,

the limit of which is equal to the sum of the fractions $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \&c.$ (continued till their number be $m - 1$) divided by $m - 1$. In like manner, by assuming other alternate, or any equivalent terms of the series $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \&c.$ we may form new progressions, the value of which may be found. Thus, if we take the terms $1, \frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \&c.$ passing over three terms, and divide the successive differences of these terms by 96 , we shall have the series

$\frac{1}{5 \cdot 24}, \frac{1}{5 \cdot 9 \cdot 24}, \frac{1}{9 \cdot 13 \cdot 24}, \frac{1}{13 \cdot 17 \cdot 24}, \&c.$ which is equivalent

to the series C , given by Mons. de Monmort, in the Philosophical Transactions, N^o 353, p. 651, viz. $C =$

$\frac{1}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5} + \frac{14}{5 \cdot 6 \cdot 7 \cdot 8 \cdot 9} + \frac{55}{9 \cdot 10 \cdot 11 \cdot 12 \cdot 13} + \frac{140}{13 \cdot 14 \cdot 15 \cdot 16 \cdot 17}$

+ $\&c.$ the sum of which will therefore be $\frac{1}{96}$. And if we take the alternate terms of the series $\frac{1}{2}, \frac{1}{12}, \frac{1}{36}, \frac{1}{80}, \&c.$ above mentioned, and divide the successive differences of

the terms by 2 , we shall have the series $\frac{5}{2 \cdot 12}, \frac{9}{12 \cdot 30},$

$\frac{13}{30 \cdot 56}, \&c.$ which is equivalent to the series $\frac{5}{1 \cdot 2 \cdot 3 \cdot 4}, \frac{9}{3 \cdot 4 \cdot 5 \cdot 6},$

$\frac{13}{5 \cdot 6 \cdot 7 \cdot 8}, \frac{17}{7 \cdot 8 \cdot 9 \cdot 10}, \&c.$ mentioned in the said Philosophi-

cal Transactions, and marked A , the sum or limit of which, by the foregoing rule, will be $\frac{1}{4}$. So the limit of Mr. Mon-

mort's series $B = \frac{1}{1 \cdot 2 \cdot 3 \cdot 4 \cdot 5} + \frac{4}{4 \cdot 5 \cdot 6 \cdot 7 \cdot 8}, \&c.$ will be $= \frac{1}{108}$.

See Maclaurin's Fluxions, art. 356, where there is an error of the press, in p. 296, l. 11 and 15; for the series which in line 11 is said to be Mr. Monmort's series B , is the series A , p. 651, of the Philosophical Transactions, N^o 353, aforesaid; so in line 15, for A , read B .

This may suffice to shew how the sums of progressions so derived may be found. We refer, for the farther application of these principles, to the aforesaid Treatise of Fluxions, art. 357, $\&c.$ Mr. Stirling's Treatise of the Summation of Series ought also to be consulted, as he has improved the method of approximating to the value of progressions, which often arise in the solution of problems. See also Mr. de Moivre's Miscellanea Analytica, and particularly the supplement to that work. Methodus Differentialis, five Tractatus de Summatione et Interpolatione Serierum infinitarum, Lond. 1730, 4to.

PROGRESSION, Arch of a. See ARCH.

PROGYMNASMATA, προγυμνασματα, in *Antiquity*, certain preparatory exercises performed by all those who offered themselves to contend in the Olympian games.

PROHIBITED GOODS, in *Commerce*, such commodities as are not allowed to be either imported or exported. See CONTRABAND.

PROHIBITIO *de vasto directa parti*, in *Law*, is a writ judicial, directed to the tenant, prohibiting him from making waste upon the land in controversy, during the suit. It is sometimes also directed to the sheriff.

PROHIBITION, PROHIBITIO, the act of forbidding, or inhibiting any thing.

It is the prohibition of the law that makes the sin; a testator frequently bequeaths things with a prohibition to alienate.

PROHIBITION, in *Common Law*, denotes a writ issued out of the chancery, the king's bench, common pleas, or exchequer, to forbid some other court, either spiritual or secular, to proceed in a cause there depending, upon suggestion, that the cognizance thereof belongeth not to that court.

It is now usually taken for that writ which lieth for one who is impleaded in the court Christian, for a cause belonging to the temporal jurisdiction, or the cognizance of the king's courts; by which, as well the party and his counsel, as the judge himself, and the register, are forbidden to proceed any farther in that cause.

PROHIBITIONS, in *Musick*, during the seventeenth century. The church style, during that period, was much changed, not only by the imitations of dramatic music, and the introduction of instruments, but by writing in transposed keys, and supplying the deficiencies in the scales, which too strict an adherence to the species of octave, and modes of the church, had occasioned. Indeed, before this time, there was no decision of keys, either in sacred or secular music, according to our present rules of beginning and ending upon the chord, major or minor, of some determinate note of the scale. The prohibitions were so numerous in the writings of the old theorists, that if the most regular modern compositions were tried by such rules as subsisted at the beginning of the last century, they would appear extremely licentious. No part was to be extended above or below the staff, or five regular lines, on which it was written; the combination of chords was never to be broken by moving to an unrelative harmony; and the intervals of the sharp seventh, the tritonus or sharp fourth, false fifth, sharp second, and even the major sixth, were prohibited. Indeed, an excellent composition might now be produced, merely from ancient disallowances.

PROHIBITO, in the *Italian Musick*, is a term applied to such parts of a piece as are not proper, or according to just rule. Thus, *intervallo proibito* is every interval in melody that does not pass the ear easily or naturally, to give it some pleasure; such are the tritone, the sixth major, the seventh, ninth, &c. though, under certain circumstances, even these have pleasing effects, in that by their harshness they render the subsequent concords more agreeable.

PROJECTILE, or PROJECT, in *Mechanics*, a heavy body, which, being put into motion by an external force impressed upon it, is dismissed from the agent, and left to pursue its course.

Such, *e. gr.* is a stone thrown out of the hand or a sling, an arrow from a bow, a bullet from a gun, &c.

PROJECTILES, the cause of the continuation of the motion of, or what it is determines them to persist in motion, after the first cause ceases to act, has puzzled the philosophers. See MOTION and COMMUNICATION.

The Peripatetics account for it from the air, which, being violently agitated by the motion of the projecting cause, *e. gr.* the hand and sling, and forced to follow the projectile, while accelerated in it, does, upon the dismissal of the projectile, press after it, and protrude it forward, to prevent a vacuum.

The moderns account for the motion of projectiles on a much more rational and easy principle; it being, in effect, a natural consequence from one of the great laws of nature; *viz.* that all bodies, being indifferent as to motion or rest, will necessarily continue the state they are put into, except so far as they are hindered, and forced to change it by some new cause.

Thus a projectile, put in motion, must continue to move eternally in the same right line, and with the same velocity, were it to meet with no resistance from the medium, nor had any force of gravity to encounter.

The doctrine of the motion of projectiles is the foundation of all gunnery.

PROJECTILES, *Theory of*, is that branch of mechanics which relates to the motion, velocity, range, &c. of heavy bodies projected into space by any external force.

This subject may be considered under two distinct heads, *viz.* 1. With reference to bodies moving in void space, or, as is usually said, in a non-resisting medium; and 2. When the body is projected into a resisting medium, as air, water, &c.

Of the Theory of Projectiles in vacuo.—As the curve described by a projectile in void space depends upon its first initial velocity and the law of acceleration which a body would in this case observe in its fall towards the earth by the action of gravity, and as the latter was not known till the discovery of it by Galileo, it follows *à fortiori* that the real path of a projectile was also unknown before the time of this celebrated philosopher, who not only determined the true nature of the curve, shewing it to be the common parabola, but he examined also various circumstances relative to its motion. He shews how to ascertain the impetus for any range and elevation, and how the range was to be found when the impetus and elevation were given; and the elevation from the range and impetus. He demonstrated also, that the velocity of the projectile in any point of the curve, is equal to that which would be generated by a heavy body in falling, though one-fourth of the parameter to the diameter at that point; that the greatest range, the impetus being the same, is when the angle of elevation is 45° ; and that the ranges are equal for angles equally above and below 45° ; limiting his enquiries, however, in all these cases to the horizontal plane only.

Toricelli, the worthy pupil of so great a master, pursued the subject still farther, and investigated all the circumstances of a projectile, with reference to the inclined plane; and, amongst other very interesting properties he discovered, that the locus of the vertices of all the parabolas described by a body thrown from the same point with the same velocity, but with different degrees of elevation, was itself a parabola, of which the point of projection was the focus. In fact, the theory of projectiles in non-resisting mediums has received very little addition since the time of Toricelli, except so far as regards simplicity; but, in this respect, it has received great improvement in the hands of more modern mathematicians. We shall endeavour to condense all the most important propositions connected with this theory in the shortest space possible, in order that we may enter more at length on the subject when we come to consider it with reference to the resistance of the air, which is, in fact, the only useful case; for though there

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there is not perhaps any branch of mixed mathematics, which presents a more elegant and interesting theory than that of projectiles in a non-resisting medium, it unfortunately happens also that there is none, in which theory and practice are more at variance with each other, in consequence of rejecting the air's resistance, which is so great, that, in many cases, the computed range exceeds the real range obtained in practice, by more than twenty miles.

PROP. I.—If a body be projected into a non-resisting medium, either parallel, or any way inclined to the horizon, it will, by this motion, combined with that resulting from the action of gravity, describe the curve of a parabola.

Let a body be projected from A, (*Plate XXXVI. Mechanics, fig. 7.*) in the direction AD, with an uniform velocity, which would carry it over the equal spaces AB, BC, CD, &c. in equal portions of time, and BE, CF, DG, &c. the spaces through which a heavy body would descend by the force of gravity in those times; then it follows, from the principles of the composition of motion, that the body would be found at the end of these portions of time in the points E, F, G; or that its path will be the curve A E F G H passing through those points, and which is to be demonstrated to be a parabola.

Let t , T, represent the times the body would take in passing over any two of those spaces AB, AD; then since the motion in this direction is uniform, we have

$$\begin{array}{l} \text{therefore} \quad AB : AD :: t : T \\ \text{but} \quad \quad \quad AB^2 : AD^2 :: t^2 : T^2 \\ \quad \quad \quad BE : DG^2 :: t^2 : T^2 \end{array}$$

by the laws of falling bodies; therefore

$$AB^2 : AD^2 :: BE : DG$$

which is a known property of the parabola.

Cor. 1.—The velocity in the direction AD being uniform, the horizontal velocity is also uniform; and it is to the former as the cosine of the angle HAD of elevation to radius.

Cor. 2.—The velocity in the direction of gravity at any point F, is to the first projectile velocity, as 2 CF to AC. For this velocity would carry the body over 2 CF in the same time by the law of falling bodies, but in the same time the projectile velocity would carry the body over the space AC; therefore the former velocity is to the latter as 2 CF : AC.

Cor. 3.—Let PA be the height due to the first projectile velocity, or that space through which a heavy body must fall to acquire a velocity equal to that of projection, and DG be an ordinate equal to PA; then the velocity in the direction of gravity at G, will be equal to the projectile velocity at A; but it has been shewn that these velocities are to each other as 2 DG to AD, therefore, being equal at this point, we have 2 DG or 2 PA = AD, whence $AD^2 = 2 DG \times 2 PA$, or $DG^2 = 4 PA \times DG$, consequently $PA = \frac{1}{4}$ of the parameter of the diameter at A; and, therefore,

$$\begin{array}{l} AB^2 = 4 AP \times BE \\ AC^2 = 4 AP \times CF \\ AI^2 = 4 AP \times IH \\ \&c. = \quad \&c. \quad \&c. \end{array}$$

Cor. 4.—Hence again it follows, that the velocity of a projectile in the direction of the curve, or of its tangent, at any point, is equal to that which would be generated by gravity in a heavy body falling through $\frac{1}{4}$ of the parameter at that point. Whence, and from the known property of the direction of a parabola, it appears, that if from the

direction of the parabola the several lines HE, HE, &c. be drawn perpendicular to H, H, &c. (*fig. 8.*) then the velocity of the projectile in the direction of the curve, at any point E, is always equal to the velocity acquired by a body falling through HE.

Cor. 5.—It follows also from this property, that the motion of the projectile in the direction of the curve, is the least at the vertex of the parabola, at which point also the projectile is at its greatest height above the point of projection.

From these properties we may readily draw the geometrical construction for the determination of the range, elevation, or impetus, any two of them being given.

PROP. II.—Having given the velocity, or the height due to the velocity, and the angle of elevation, to find the range upon any given plane passing through the point of projection; whether parallel or oblique to the horizon.

Let PA (*fig. 9.*) be the height due to the velocity, or that through which a body must fall to acquire a velocity equal to that of projection, the direction of which let be AI; and AH the given plane.

From P draw PQ, making the angle APQ = the angle QAR; take AI = 4 AQ, and draw HI parallel to PA, so shall AH be the range required.

For the triangles APQ, AIH, are similar, and therefore AP : AQ (= $\frac{1}{4}$ AI) :: AI : IH, whence $\frac{1}{4} AI^2 = PA \cdot IH$, or $AI^2 = 4 PA \times IH$; therefore H is a point in the parabola by cor. 3. above.

Cor.—Draw QV parallel to AH, and V will be the vertex of the parabola, which will give the greatest height, Vn, of the projectile above the plane by cor. 4; and which, since Vn = QR, it is equal to $\frac{1}{4}$ of IH.

PROP. III.—Given the range and impetus, to find the angle of elevation.

On PA, the height due to the impetus, describe a segment to contain an angle equal to ARQ, or a AP, and take AR = $\frac{1}{4}$ AH, and draw QR parallel to AP, cutting the circle in QQ', so shall AQ, or AQ', be the direction required.

For since the angle AQP = ARQ, and PAQ = AQR, because of the parallels AP, QR, it follows that the angle APQ = QAR; and since AR = $\frac{1}{4}$ AH, AQ = $\frac{1}{4}$ AI; therefore AQ is the direction required, as is obvious from the preceding proposition.

Cor. 1.—Hence it follows, that there are always two angles of elevation which give the same range, except when the two points QQ' coincide, or when the angle PAH is bisected, in which case the range is the greatest possible, as is obvious.

Cor. 2.—Hence the greatest range for the horizontal plane, is when the angle of elevation is 45°.

Cor. 3.—Hence also, when it is required to determine the greatest range with a given impetus, we must bisect the angle PAH, which will be the angle of direction, from which the range will be found as in prop. 2.

PROP. IV.—Having given the range and elevation, to find the height due to the velocity,

Draw PA perpendicular to the horizontal line AB; take AR = $\frac{1}{4}$ AH; also draw QR parallel to PA, and from Q draw QP, making the angle AQP = AQR, and the point P, where this line cuts PA, will give the height due to the projectile velocity; as is obvious from the demonstrations given above.

The above propositions include all the most important cases relating to projectiles, when the plane passes through the point of projection; we shall therefore only add another for

for the case in which the plane does not pass through that point.

PROP. V.—Given the direction and velocity, to find the point where the projectile meets a plane given in position.

Let AP (*fig. 10.*) be the height due to the velocity, AI the direction, and BC the plane. Produce BC to meet PD in D , DP being perpendicular to PA , which produce to cut the plane BC in B . Make the angle $RAF = RAP$, and $AF = AP$, and join DF , and from the centre B , with the distance BP , describe a circle cutting DF in N ; join BN , parallel to which draw FC , which will cut the plane in the point C required.

For draw EC perpendicular to PD , then since $AP = AF$, by construction, F is the focus of the parabola; also

$$DB : DC :: BN : CF, \text{ and} \\ DB : DC :: BP : CE$$

But $BN = BP$, therefore $CF = CE$, and consequently the point P is in the parabola.

And it is obvious, that the same construction applies to the preceding propositions, the only difference being, that the points A and B in those cases coincide.

Cor.—When the point is given on the plane, and the elevation or impetus is required, it is obvious that the construction is then the same as in prop. 2, or prop. 3, whether the plane pass through the point of projection or not.

From the preceding constructions it will be easy to compute the several cases trigonometrically.

Let $AP = m$, then $v = 2\sqrt{gm}$, the time of flight $= t$, $16\frac{1}{2} = g$, the greatest height $vn = h$. Make also, for the sake of abridging the expressions, the angles BAI , BAH , and HAI , respectively equal to a , b , c .

Then $AI = tv$; and as $\sin. AHI (= \text{cof. } b) : \sin. c$
 $:: AI (= tv) : \frac{\sin. c}{\text{cof. } b} \cdot tv = IH = gt^2$, by the laws of

falling bodies $= 4h$, by cor. 5, prop. 1; hence $\frac{\sin. c}{\text{cof. } b}$

$tv = gt^2 = 4h$; whence we draw $v = \frac{\text{cof. } b}{\sin. c} gt$, and $t = \frac{\sin. c}{\text{cof. } b} \cdot \frac{v}{g}$.

Again, as $\sin. AHI (= \text{cof. } b) : \sin. HIA (= \text{cof. } a)$
 $:: AI : AH$, whence $AH = \frac{\text{cof. } a}{\text{cof. } b} \cdot AI = \frac{\text{cof. } a}{\text{cof. } b} tv$.

Now, substituting in this last expression the values of t and v , as found above, we have, for the range r , the following values; *viz.* $r = \frac{\text{cof. } a}{\text{cof. } b} tv = \frac{\text{cof. } a}{\sin. c} gt^2 = \frac{\text{cof. } a \cdot \sin. c \cdot v^2}{\text{cof.}^2 b \cdot g} = \frac{\text{cof. } a \cdot \sin. c}{\text{cof.}^2 b} \cdot 4m = \frac{\text{cof. } a}{\sin. c} 4h$.

From which, it is obvious, we may readily find t , v , m , or h , when the range r is given; as we may also the angle of elevation and the inclination of the plane, when these are to be determined.

When the plane is horizontal these expressions become more simple, for in that case $\text{cof. } b = 1$, and angle $a =$ angle c , whence the above become $r = \text{cof. } a tv = \frac{\text{cof. } a}{\sin. a}$

$gt^2 = \text{cof. } a \cdot \sin. a \cdot \frac{v^2}{g} = \text{cof. } a \cdot \sin. a \cdot 4m = \frac{\text{cof. } a}{\sin. a} 4h$.

And these, again, by substituting $\sin. a \text{ cof. } a = \frac{1}{2} \sin. 2a$, and $\frac{\sin. a}{\text{cof. } a} = \tan. a$, are rendered still more simple, particu-

larly those which relate to the angle of elevation. We have

$$\text{thus } r = \frac{gt^2}{\tan. a} = \sin. 2a \frac{v^2}{2g} = \sin. 2a \cdot 2m$$

$$\sin. a = \frac{gt}{v} = \frac{2}{v} \sqrt{gb} = \frac{tv}{4b}$$

Cor. 1.—From the last value of r it is obvious, that in the horizontal plane the range varies, the impetus being the same, as the sine of the double angle of elevation, and, therefore, that it is the greatest when that angle is 45° , or when the angle subtended by the impetus and plane is bisected; and the same is also true in the latter sense for the oblique plane.

Cor. 2.—And in both cases, all angles equally above and below that which gives the maximum range, will give equal ranges, as may be readily deduced from the preceding formulas.

Cor. 3.—All other things being the same, the range varies as v^2 , or as the square of the velocity, as does also the greatest height of the projectile above the plane.

Cor. 4.—The time of flight varies as the velocity, or as the impetus.

For more on this subject, see Robins's Gunnery, Hutton's Tracts, and Burrow's Theory of Gunnery, contained in his Restitution of the Inclinations of Apollonius.

Theory of Projectiles in Resistling Mediums.—We have already observed, that the doctrine of projectiles in a non-resistling medium, is only to be considered as an elegant theory, which is, in fact, almost entirely useless in practice, in consequence of its not taking any account of the resistance of the air; it being only with very small velocities, that there is any tolerable agreement between experiments and the computed ranges. But when the velocity is at all considerable, the resistance becomes very great, and such as to render the parabolic theory of no practical use whatever. The inaccuracy of those authors who have treated the subject upon the supposition of the resistance of the air being inconsiderable, will easily appear from what is established by Robins in his New Principles of Gunnery, where he has shewn that this resistance to a cannon ball amounts to more than twenty times the weight of the ball. What errors may not be expected from an hypothesis which neglects this force as inconsiderable? In effect, it will not be difficult to shew, that the track described by the flight of shot or shells, is neither a parabola nor nearly a parabola. For by that author's experiments it appears, that a musket-ball of three-fourths of an inch diameter, fired with half its weight of powder from a piece forty-five inches long, moves with a velocity of nearly 1700 feet in a second. Now, by the common parabolic theory, if this ball flew in the curve of a parabola, its horizontal range at 45° would be found to be about seventeen miles. But from practical writers, as Diego Ufano, and Merfennus, it appears, that this range is short of half a mile; so that a musket-shot at 45° elevation, with a reasonable charge of powder, flies not the $\frac{1}{34}$ th part of the distance it ought to do, if it moved in a parabola.

Nor is this great diminution of the horizontal range to be wondered at, when it is considered that the resistance of the air to this bullet, when it first issues from the piece, amounts to one hundred and twenty times its gravity

Again, if the flight of the heaviest shot, in common use for land service, as of iron bullets of 24 lb. weight, be examined, it will appear, that such a shot, with a full charge of powder, has a velocity of 1650 feet in 1". And the horizontal range at 45° of this shot, would, according to the parabolic hypothesis, be about sixteen miles; but by the experiments of St. Remy it appears, that the range is really short

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short of three miles; which is not one-fifth of the distance it ought to fly, if it described the curve of a parabola.

And this deviation from the parabola happens not only in these great velocities, but in such as are much less; thus in velocities of about 400 feet in 1", by several experiments it appears, that the range of a leaden bullet of three-fourths of an inch in diameter, fired at different elevations with this velocity, did not at all answer the common theory. So that it sufficiently appears that any theory, which depends upon the supposition of the inconsiderableness of the air's resistance to projectiles, is useless.

Indeed, the inaccuracy of this hypothesis almost appears at sight, even in projectiles slow enough to have their motion traced by the eye; few there are who do not descend through a curve manifestly shorter and more inclined to the horizon than that in which they ascended, and the highest point of their flight, or the vertex of the curve, is much nearer to the place where they fall on the ground, than to that whence they were at first discharged. These things cannot be a moment doubted of by any one, who in a proper situation views the flight of stones, arrows, or shells, thrown with any considerable velocity.

What is here advanced may be confirmed from the constant observation of all who are conversant in the practice of throwing shells, *viz.* that the ranges at elevations below 45° , constantly exceed the ranges at elevations above 45° , which are respectively at an equal distance from 45° . But it is known that in the parabolic hypothesis these ought to be equal; which is a farther proof of the fallacy of this hypothesis.

There is also a singular phenomenon in the motion of bodies projected with considerable force, which shews the great complication and difficulty of this subject; which is that bullets in their flights are not only depressed beneath their original direction by the action of gravity, but are also frequently driven to the right or left of that direction by the action of some other force.

If it was true, that bullets varied their direction by the action of gravity only, then it ought to happen that the errors in their flight to the right or left of the mark they were aimed at, should increase in the proportion of the distance of the mark from the piece only. But this is contrary to all experience; the same piece which will carry its bullet within an inch of the intended mark, at ten yards distance, cannot be relied on to ten inches in one hundred yards, much less to thirty inches in three hundred yards.

Now this inequality can only arise from the track of the bullet being incurvated sideways, as well as downwards: for, by this means, the distance between the incurvated line, and the line of direction, will increase in a much greater ratio than that of the distance; these lines being coincident at the mouth of the piece, and afterwards separating in the manner of a curve from its tangent, if the mouth of the piece be considered as the point of contact.

This is put beyond dispute from the experiments made by Mr. Robins; who informs us, that having taken a barrel carrying a ball of three-fourths of an inch diameter, and fixing it on a heavy carriage, he satisfied himself of the steadiness and truth of its direction, by firing at a board $1\frac{1}{2}$ foot square, at the distance of one hundred and eighty feet, and missed it but once in sixteen successive shot. Now the same barrel being fixed on the same carriage, and fired with a smaller quantity of powder, so that the shock on the discharge would be much less, and consequently the direction less changed, he found that at seven hundred and sixty yards distance the ball flew sometimes one hundred yards to the

right of the line it was pointed on, and at other times one hundred yards to the left. He found, too, that its direction in the perpendicular line was not less uncertain, it falling one time above two hundred yards short of what it did at another; although by the nicest examination of the piece after the discharge, it appeared not to have the least started from the position it was placed in.

If it be asked what can be the cause of a motion so different from what has been hitherto supposed? It may be answered, that the deflection in question must be owing to some power acting obliquely to the progressive motion of the body, which power can be no other than the resistance of the air. And this resistance may perhaps act obliquely to the progressive motion of the body, from inequalities in the resisted surface; but its general cause is doubtless a whirling motion acquired by the bullet about its axis; for by this motion of rotation, combined with the progressive motion, each part of the bullet's surface will strike the air in a direction very different from what it would do if there was no such whirl; and the obliquity of the action of the air arising from this cause will be greater, according as the rotatory motion of the bullet is greater in proportion to its progressive motion. Principles of Gunnery in Tracts, vol. i. p. 149, &c.

Euler, on the contrary, attributes this deflection of a bullet to its figure, and scarcely at all to its rotation: for, if the bullet was perfectly round, though its centre of gravity did not coincide with its centre of magnitude, the deflection from the axis of the cylinder, or line of direction sideways, would be very inconsiderable. If such a ball goes to the right or left of an object, it is certain that the object does not lie in the same vertical plane with the axis of the piece. But if it be not round, it will generally go to the right or left of its direction, and so much the more, as it goes farther from the piece. He infers from his reasoning on this subject, that cannon-shot, which are made of iron, and rounder and less susceptible of a change of figure in passing along the cylinder than those of lead, are more certain than musket-shot.

There is another circumstance, however, which appears to us to account for the irregular motion of shot, which is the windage; for the ball not exactly fitting the bore of the cannon, and the explosion of the powder not taking place exactly in the axis of the gun, it must necessarily happen, that in the motion of the ball along the barrel, it strikes sometimes one side and sometimes another of the bore, and that it will, therefore, be elevated or depressed, or be thrown to the right or left of the object, according to the point at which it was last in contact with the mouth of the cannon. That this is the true cause of the irregular motion we are speaking of, is made pretty obvious from an experiment reported by M. Guyton, in vol. viii. of the Memoirs of the National Institute. In this experiment the bore of the cannon was slightly conical, the greater part being at the breech, where the cannon was charged with a leaden bullet, as in a rifle gun, and which consequently must undergo a slight change in its form in passing through the bore of the piece, so that there was no windage, and the consequence was the most complete regularity in the flight of the shot, the deviation being scarcely perceptible in the longest ranges.

Another experiment is reported in the same Memoir, which it is important to detail, because it contradicts a sort of hypothesis which has been almost universally admitted, and in some measure justified by experiment; namely, that the less the windage, the greater the range, all things else being the same; but it appears from the experiments above alluded to, that the medium range of a number of experiments, in which the

the windage was reduced to half a millimeter, was only about half the range with a windage of a millimeter; but that the ranges again decreased by diminishing farther the size of the shot; so that the millimeter, answering to about $\frac{1}{32}$ th of an English inch, seems to be the best suited for giving the greatest range. This experiment appears to be at variance with the one mentioned above by the same author, and also with some other of his experiments made with balls of new construction, which M. Guyton calls "bullet a bague de plomb," which are constructed so as to prevent any windage, by a collar of lead fixed about the middle of the ball; with these, though their weight was nearly double that of a common shot, the range was in some cases greater, and in very few less, than with the common ball, the charge and every thing else being exactly the same. The former anomaly, therefore, both M. Guyton and M. Prony endeavour to account for, by the protrusion of the vertical diameter of the shot, and the consequent friction between the ball and the bore of the cannon, both of which appear to have been brass in these experiments; and which friction they suppose to be so much greater than that between lead and brass, as to be sufficient to account for the great defect in the ranges in the former case: we are doubtful, however, how far this may be considered as a satisfactory explanation.

The most complete set of experiments made with a view of obtaining a rational theory of projectiles in air, are those of Dr. Hutton, which were carried on at Woolwich during the years 1775, 1783, 1784, 1785, 1787, 1788, 1789, and 1791, the objects of which were very various, and some of the results highly important. The latter are thus enumerated by the author in the second vol. of his "Tracts," lately published.

"1. It is made evident by these experiments, that powder fires almost *instantaneously*, seeing that nearly the whole of the charge fires, though the time be much diminished.

"2. The velocities communicated to the shot of the same weight, with different quantities of powder, are nearly in the subduplicate ratio of those quantities. A very small variation, in defect, taking place when the quantities of powder become great.

"3. And when shot of different weights are fired with the same quantities of powder, the velocities communicated to them, are nearly in the reciprocal subduplicate ratio of their weights.

"4. So that, universally, shots which are of different weights, and impelled by the firing of different quantities of powder, acquire velocities which are directly as the square roots of the quantity of powder, and inversely as the square roots of the weight of the shot nearly.

"5. It would, therefore, be a great improvement in artillery, to make use of shot of a long form, or of heavier matter; for thus the momentum of the shot, when fired with the same weight of powder, would be increased in the ratio of the square root of the weight of the shot.

"6. It would also be an improvement to diminish the windage; for by so doing, one-third or more of the quantity of powder might be saved."

This, however, must be understood only to be true within certain limits. See the experiments of M. Guyton, above referred to.

"7. When the improvements mentioned in the two last cases are considered as both taking place, it is evident that about half the quantity of powder might be saved, which is a very considerable object. But important as this saving may be, it seems still to be exceeded by that of the guns: for thus a small gun may be made to have the effect of one, of two, or three times its size, in the present way, by dis-

charging a long shot of two or three times the weight of its natural ball, or round shot: and thus a small ship might discharge shot as heavy as those of the greatest now made use of."

The objects of the latter courses of experiments are thus detailed; *viz.* to ascertain,

"1. The velocities with which balls are projected by equal charges of powder, from pieces of the same weight and calibre, but of different lengths.

"2. The greatest velocities due to the different charges of powder, the weight and length of the gun being the same.

"3. The greatest velocity due to the different lengths of guns; to be obtained by increasing the charge as far as the resistance of the piece is capable of sustaining.

"4. The effect of varying the weight of the piece; every thing else being the same.

"5. The penetration of balls into blocks of wood.

"6. The ranges and times of flight of balls, with the velocities, by striking the pendulum at various distances, to compare them with initial velocities, for determining the resistance of the medium.

"7. The effects of wads; of ramming, of windage, &c. &c."

We cannot of course enter in this place into any detail relative to the manner of performing these experiments, nor even of the results of them; indeed, they are not all necessarily connected with our subject, but rather belong to the general article GUNNERY; but as they have been published since that article in the present work was written, we have thought it right to give a slight abstract of the experiments in this place, but for farther particulars on some of the subjects, we must refer the reader to the work itself; others will be found illustrated at some length under the articles PENETRATION, RESISTANCE, WHIRLING Machine, Initial VELOCITY, &c. &c.

We shall here merely adopt the author's expression for the resistance of the air, as deduced from these experiments, and thence determine the ranges, times of flight, &c. of projectiles according to that hypothesis.

Theorem.—The resistance of the air to a ball projected into it with any considerable velocity, is expressed by the formula $r = (.000007565 v^2 - .00175 v) d^2$. But for the smaller velocities, $r = .0000044 d^2 v^2$ will be a sufficiently near approximation, where r represents the resistance in avoirdupois pounds, d the diameter of the ball in inches, v the velocity in English feet. See Hutton's Tracts, vol. iii. p. 232; see also our article RESISTANCE.

PROB. 1.—To determine the height to which a ball, projected perpendicularly upwards, will ascend, being resisted by the atmosphere.

Putting x to denote any variable and increasing height ascended by the ball; v its variable and decreasing velocity there; d the diameter of the ball, its weight being w ; $m = .000007565$, and $n = .00175$, the coefficients of the two terms in the above theorem. Then $(m v^2 - n v) d^2$ will be the resistance of the air against the ball in avoirdupois pounds, to which, if the weight of the ball be added, then $(m v^2 - n v) d^2 + w$ will be the whole resistance to the ball's motion, and consequently $\frac{(m v^2 - n v) d^2 + w}{w}$

$= \frac{(m v^2 - n v)}{w} d^2 + 1 = f$, the retarding force. (See ACCELERATION and RETARDATION.) Hence the general formula $v \dot{v} = 2 g f x$ (given under the former of these articles)

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articles) becomes $-v \dot{v} = 2 g x \times \frac{(m v^2 - n v) d^2 + w}{w}$ making v negative, because the velocity is decreasing, where $g = 16\frac{1}{2}$ feet, or 16 feet, the descent of a body in one second by gravity.

Hence $\dot{x} = -\frac{w}{2g} \times \frac{v \dot{v}}{(m v^2 - n v) d^2 + w} = \frac{-w}{2 g m d^2} \times \frac{v \dot{v}}{v^2 - \frac{n}{m} v + \frac{w}{m d^2}}$. The fluent of which being taken, and corrected for the instant of the first velocity V , when $x = 0$, gives $x = \frac{w}{2 g m d^2} \times \left\{ \frac{1}{2} \log. (V^2 - \frac{n}{m} V + \frac{w}{m d^2}) - \frac{1}{2} \log. \frac{w}{m d^2} + \frac{p}{q^2} (\text{arc. tan. } (V - p) - \text{arc. tan. } - p \text{ to rad. } q) \right\}$ where $p = \frac{n}{2m}$, and $p^2 + q^2 = \frac{w}{m d^2}$.

But as part of this fluent, denoted by $\frac{p}{q^2} \times$ the difference of the two arcs to $\text{tan. } (V - p)$ and $-p$, is always very small in comparison with the other preceding terms, it may be omitted without any material error in practical cases; in which case we have

$$x = \frac{w}{4 g m d^2} \times \text{hyp. log. } \frac{V^2 - \frac{n}{m} V + \frac{w}{m d^2}}{\frac{w}{m d^2}}$$

for the greatest height to which the ball will ascend in air; supposing its density uniformly the same as at the earth's surface. Now for the numerical value of the general coefficient $\frac{w}{4 g m d^2}$, and the term $\frac{w}{m d^2}$; because the mass of the ball to the diameter d is $.5236 d^3$, if its specific gravity be s , its weight will be $.5236 s d^3 = w$; therefore $\frac{w}{d^2} = .5236 s d$, and $\frac{w}{m d^2} = 69259 s d$; this divided by $4g$ or 64 ,

gives $\frac{w}{4 g m d^2} = 1082 s d$ for the value of the general coefficient, to any diameter d , and specific gravity s . And if we farther suppose the ball to be cast iron, the specific gravity of which, or the weight of a cubic inch, is $.26855 \text{ lb.}$, it becomes $290.6 d$ for that coefficient; also $69259 s d = 18600 d = \frac{w}{m d^2}$, and $\frac{n}{m} = 231.5$.

Hence the preceding fluent becomes

$$x = 290.6 \times \text{hyp. log. } \frac{V^2 - 231.5 V + 18600 d}{18600 d}$$

$$x = 669 d \times \text{com. log. } \frac{V^2 - 231.5 V + 18600 d}{18600 d}$$

which is a general expression for the altitude in feet ascended by an iron bullet, whose diameter is d , and projectile velocity V .

Example 1.—Suppose a ball of cast iron, whose diameter is two inches, and, therefore, its weight $1\frac{1}{2} \text{ lb.}$, to be projected upwards with a velocity of 2000 feet *per* second, to find the greatest height to which it will ascend.

Here, substituting for d , w , and V their respective values, we have

$$x = 669 d \times \text{com. log. } \frac{V^2 - 231.5 V + 18600 d}{18600 d} = 2653 \text{ feet.}$$

Ex. 2.—Again, let the ball weigh 24 lb., and, therefore, its diameter 5.6, and velocity 2000 feet *per* second, as before; then

$$x = 669 d \times \text{com. log. } \frac{V^2 - 231.5 V + 18600 d}{18600 d} = 5782 \text{ feet, the height required.}$$

In the first of these examples, where the height is found to be only about $\frac{1}{2}$ mile, the ball would ascend to nearly 12 miles in a non-resisting medium; and hence we may see the immense effect of atmospheric resistance to the motion of projectiles.

PROB. II.—To determine the time in which a ball will have acquired its greatest height, using the same formula of resistance as in the last case.

Here the general value of t , determined on principles similar to those above employed, gives

$$t = \frac{w}{2 g m q d^2} \times \left(\text{arc. tan. } \frac{V - p}{q} - \text{arc. tan. } \frac{v - p}{q} \right), \text{ or}$$

$$t = \frac{w}{2 g m q d^2} \times \text{arc. tan. } \frac{V - p}{q}, \text{ rejecting the latter arc as inconsiderable; } p \text{ and } q \text{ representing the same as before.}$$

Ex. 1.—Let it be proposed to find the time in which an iron ball, two inches in diameter, will acquire its greatest height, when projected with a velocity of 2000 feet *per* second.

Here $\frac{n}{2m} = 115\frac{1}{2} = p$, and $\frac{w}{m d^2} = p^2 + q^2$, gives $q = \sqrt{37153 - p^2} = 154\frac{1}{2}$; whence $t = \frac{w}{2 g m q d^2} \times \left(\text{arc. tan. } \frac{V - p}{q} \right) = 11.81 \text{ seconds.}$

If we take the second example above to find the time, we shall have $p = 115\frac{1}{2}$ as before, and $q = 299.4$; therefore $t = \frac{w}{2 g m q d^2} \times \text{arc. tan. } \frac{V - p}{q} = 16.89 \text{ seconds.}$

Dr. Hutton, after the investigation of these two problems, and some others of a similar nature, proceeds to the investigation of his principal problem, *viz.* to determine the circumstances of ranges at different degrees of elevation; which we shall transcribe in the author's own words.

“Rules for the general solution of this problem would be best derived from experiments; and these should be made at all elevations, and with all charges, and with various sizes of balls, observing both the ranges and times of flight in every experiment. Such experiments would give us the relations existing, in all cases, amongst these four terms, *viz.* the ranges, the times of flight, the velocity or charges, and the size of the balls. Numerous and various as are our experiments, as before related, and fruitful as they are in useful consequences, we have obtained but a small portion of those alluded to; nor do I know of any proper set of such experiments any where to be found. Such must, therefore, still remain a valuable desideratum; the few that we have been able to make, afford us but very few and imperfect rules, being chiefly as follows. 1. That the ranges with the one-pound balls, at an elevation of 15° , are nearly proportional to the times of flight. 2. That the ranges with the three-pound balls, at 45° of elevation, are nearly as the times of flight, and also as the projectile velocities. Besides these inferences, it does not appear that the experiments are extensive enough to afford any more useful conclusion.

“By trials, however, amongst many of the numbers in

art. 24, it appears, that in most of them at an elevation between 45° and 30° , the time of flight is nearly equal to $\frac{1}{4}$ of the square root of the range in feet, in which respect it nearly agrees with the similar rule for the time of flight in the parabolic theory, at the angle of 45° for the greatest range, which time, it is well known, is equal to $\frac{1}{4}$ of the square root of the said range in feet. Whence it is probable, that with the help of a few other ranges at several elevations, some general relations might be evinced between the ranges, and the times of flight, with the tangents of the elevation.

“But such experiments and enquiries as these, unfortunately it is no longer in my power either to procure, or by any means to promote; and we can, therefore, only endeavour to render, without them, what service we can to the state, and to philosophy, by such means as are in our power.

“There are some few theoretical principles which it may be useful to notice here, as first mentioned by professor Robinson. Thus balls of equal density, discharged at the same elevation, with velocities which are proportional to the square roots of their diameters, will describe similar curves; because then the resistances will be in proportion as the momentum or quantity of motion. For the resistance r , is $d^2 v^2$ nearly; d being the diameter, and v the velocity. But v being as \sqrt{d} , v^2 will be as d ; consequently $d^2 v^2$ will be as d^3 ; that is, r is as d^3 . But the momentum is as the magnitude or mass, which is as d^3 also, the cube of the diameter. Therefore the resistance is proportional to the momentum, when the velocity is as \sqrt{d} , or the square root of the diameter of the ball. In this case, then, the horizontal velocity at the vertex of the curve will be proportional to the terminal velocity; also the ranges, and heights, and all other similar lines in the curve, will be proportional to d , the diameter of the ball. And this principle may be of considerable use; for thus, by means of a proper series of experiments on one ball, projected with different velocities and elevations, tables may be constructed, by which may be ascertained the motions in all similar cases.”

The following table, deduced partly from theory, and partly from experiment, may be found of use by analogy in many cases.

TABLE of the Motions of a 24lb. Shot, projected at 45° Elevation.

Velocity per Second.	Range in Vacuo.	Range in the Air.	Range corrected.	Height the Ball rises to.
Feet.	Yards.	Yards.	Yards.	Yards.
200	415	320	330	100
400	1658	1000	1019	300
600	3731	1391	1419	400
800	6632	1687	1719	464
1000	10362	1840	1878	515
1200	14922	1934	1978	561
1400	20310	2078	2129	606
1600	26528	2206	2264	650
1800	33574	2326	2391	694
2000	41450	2438	2510	738
2200	50155	2542	2622	778
2400	59688	2640	2726	816
2600	70050	2734	2823	852
2800	81241	2827	2916	887
3000	93262	2915	3002	922
3200	106111	2995	3086	996
1	2	3	4	5

This table contains, in the first column, the velocity, in feet, of a 24lb. shot, projected at an angle of 45° ; the second column shews the distance, in yards, to which the ball would go, in vacuo, on an horizontal plane; the third column contains the distance to which it will range through the air, considered all of the same density as at the earth's surface; the fourth shews the same ranges corrected for the diminution of the air's density as the ball ascends, and is, therefore, called the corrected range; and the fifth column shews the height to which the ball rises in the air, or the height of the vertex of the curve above the plane.

By this table it appears, what an immense difference there is between the motions through the air and in void, especially with the large velocities. It is seen that the ranges through the air, instead of increasing in the duplicate ratio of the initial velocities, as in non-resisting space, really increase slower than those velocities, in all the actual cases of military service; and in the most useful cases, viz. from 800 to 1600 feet, they increase nearly as the square roots of the velocities. A set of similar tables, made with the same shot at other elevations, would nearly complete what might be done by theory, as well as useful and necessary for practice.

To use the foregoing Table.—Suppose it were required to find the dimensions of the path described by a 12lb. shot, discharged with 1600 feet velocity, at an elevation of 45° degrees. Here, recollecting that the curves are similar, and their corresponding lines proportional to the diameters of the shot, when these are discharged with velocities that are to one another as the square roots of the same diameters; we must, therefore, first find what velocity of the 24-pound shot, or tabular ball, corresponds to the 1600 feet velocity of the 12-pounder, in this manner. The diameters of the two balls being 4.403 and 5.546, it will be as $\sqrt{4.403} : \sqrt{5.546} :: 1600 : 1796$, the corresponding velocity of the 24-pounder; which being sought in the table, the range and height answering to it are there found to be 2386 and 692; therefore, as $5.546 : 4.403 :: 2386 : 1894$ yards the range, and $5.546 : 4.403 :: 692 : 549$ yards the altitude. That is, the range is about $1\frac{1}{2}$ of a mile; and the height about $\frac{1}{2}$ of a mile.

Again, to find the range and greatest altitude of a 9lb. ball, projected with 1500 feet velocity. The diameter of the 9-pound ball being 4 inches, we have $\sqrt{4} : \sqrt{5.546} :: 1500 : 1766$, to which, in the table, correspond 2343, and 680, for the tabular range and altitude. Then

$$5.546 : 4 :: 2343 : 1690 \text{ the range} = 1 \text{ mile nearly.}$$

$$5.546 : 4 :: 680 : 491 \text{ the height} = \frac{1}{2} \text{ mile nearly.}$$

The same table may also serve for computing the ranges of mortar shells. For this purpose, we have only to find what must be the initial velocity of the 24-pound shot, corresponding to the proposed velocity of the shell. This must be deduced from the diameter and weight of the shell, by making the velocity of the 24-pounder such, that the ratio of its weight to the resistance may be the same as in the shell.

Thus, to find the range of the 13-inch shell, projected with the velocity of 2000 feet per second, at 45° elevation. Here the diameter being 12.8, we have $\sqrt{12.8} : \sqrt{5.546} :: 2000 : 1317$, and as $178 : 149.4 :: 1317 : 1105$, the correspondent velocity of the 24-pounder; to which, in the table, answers the range 1930; then as $5.546 : 12.8 :: 1930 : 4455$ yards, or about $2\frac{1}{2}$ miles the range. Hutton's Tracts, vol. iii.

PROJECTING TABLE. See TABLE.

PROJECTION, in *Mechanics*, the action of giving a projectile its motion. See PROJECTILE.

If the direction of the force by which the projectile is put in motion, be perpendicular to the horizon, the projection

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is said to be perpendicular; if parallel to the apparent horizon, it is said to be an horizontal projection; if it make an oblique angle with the horizon, the projection is oblique. The angle IAB (*Plate XXXVI. Mechan. fig. 9.*) which the line of direction AI makes with the horizontal line AB , is called the *angle of elevation of the projectile*.

PROJECTION, the art of forming the representation of a body upon a plane, by drawing straight lines through a given point or parallel from the contour, and from the intermediate lines of the body, if any, so as to cut the plane; then colouring the respective compartments, or each compartment, according to the degree of light, shade, and hue of the surfaces, or of each surface.

If the projection is made by drawing straight lines from a point, it is called a perspective representation; but if formed by parallel lines, it is called an orthography, or the orthographical representation, which is the subject of the present article, the former having been already given under the article **PERSPECTIVE**.

Definitions.

1. The plane on which the object is represented, is called the plane of projection.

In orthographical projection, the rays by which the projection is formed, are here understood to be perpendicular to the plane of projection.

2. If the projection is made on a plane parallel to the horizon, or on a plane representing the horizon, it is called the plan of the object.

3. If the projection is made on a plane perpendicular to the horizon, or on a plane representing a vertical plane, it is called the elevation of the object.

4. The plane of position of an inclined line and a plane, is another plane passing along the line perpendicular to the plane.

5. The inclination of a line to a plane, is the angle on the plane of position comprehended between the line and the plane.

6. The plane on which any object is given, is called the primary plane.

7. A point on a plane is said to be given when its situation is known in respect of some given line, with regard to some fixed point in that plane.

8. The position of a line to a plane is said to be given when the seat of the line is given upon the plane, and when the angle which the line makes with its seat is known.

9. In the representation of figures, in planes inclined to the plane of projection, the situation of the figure, in respect to the intersection of its plane with the plane of projection, is supposed to be known. The intersection is, therefore, given on the plane of projection, and the space on the one side is to be considered as the original plane, while that on the other is the plane of projection.

Axiom.—If any point, line, or plane, coincide with the plane of projection, that point, line, or plane, so coincident, is both the original and the projection, of that point, line or plane.

PROPOSITIONS.

I. The projection of a point is in a straight line drawn from the original point perpendicular to the intersection.

For, suppose a plane to pass through the original point perpendicular to the primary plane and to the plane of projection, the intersection of this plane with each of these planes will be perpendicular to the intersection of the primary plane and the plane of projection; but lines which are perpendicular to the same straight line, drawn from the same

point, are in the same straight line, and, therefore, the projection of a point is in a straight line drawn from the original point perpendicular to the plane of projection.

II. The orthography, or projection of a straight line, is also a straight line.

For, let a plane pass through the original straight line perpendicular to the plane of projection, to intersect it; now the intersection of one plane with another is a straight line; therefore the orthographic representation is also a straight line.

III. All original parallel straight lines are represented by parallel straight lines.

IV. The orthographical representation of a line parallel to the plane of projection, is a line equal and parallel to its original.

V. The orthographical representation of a line parallel to the intersection, is a line equal and parallel to the original.

VI. The orthographical representation of a plane figure parallel to the plane of projection, is a figure equal and similar to the original.

VII. All planes perpendicular to the plane of projection, are represented as straight lines.

VIII. All straight lines in the primary plane perpendicular to the intersection, have their representations also perpendicular to the intersection.

IX. Every straight line in a plane perpendicular to the plane of projection, is represented by the intersection, or a part of the intersection, of that plane.

PROBLEM I. *Plate I. fig. 1.*

Given a point on a plane inclined to the plane of projection, to find the orthography of the point.

Let AB (*fig. 1.*) be the intersection, and let g' be the original point. Draw gg' perpendicular to AB , and through any other point D in AB , draw CE parallel to gg' ; make the angle CDF equal to the inclination of the planes; draw $g'C$ parallel to BD , and draw Ce perpendicular to DF , cutting DF in e ; make De equal to De ; draw Eg parallel to AB , then g is the representation of the point g' . For the representation of g' is in the line $g'g$; but it is also in the line Eg : it will therefore be found in the intersection, g , of the lines Eg and $g'g$.

PROB. II. *Fig. 2.*

To find the orthography of a line on an inclined plane, the line being placed obliquely to the intersection.

Method 1. *Fig. 2.*

Let AB be the intersection (*fig. 2.*), and $k'b'$ the line. Find k and b the representations of the points k' and b' , by problem I.; join kb , and kb is the orthographic representation of the line required.

For since b is the representation of the point b' , and k the representation of the point k' , the extremities of the given line, the straight line bk , joining these two points, is the orthography of the line $b'k'$ by prop. I.

Method 2. *Figs. 3 and 4.*

The intersection AB , the line EC , and the angle CDF , are here supposed to be the same as in *fig. 1.*

Let $g'b'$ be the original line; produce $g'b'$, (*fig. 3.*) to meet EC in C , and AB at i . Draw Ck perpendicular to DF , cutting DF in k : make DE equal to DK , and join Ei ; then Ei is the orthography of the line Ci . Draw $g'g$ parallel to CE , cutting Ei at g ; $b'b$ parallel to $g'g$, cutting Ei at b ; then bg is the representation of $b'g'$.

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Method 3. Fig. 4.

Let $g'b'$ be inclined the contrary way; find the orthography, g , of the point g' , as in problem I., and join gi : draw $b'b$ perpendicular to AB , cutting Ei at g ; then the intercepted part, gb , is the orthography of $g'b'$, as required.

PROB. III. Fig. 5.

To find the orthography of a line perpendicular to the primitive.

Find g , the orthography of g' , by problem I.; draw $g'C$ parallel to AB , cutting CE at C ; make CK equal to the height of the line; draw KO perpendicular to FD , cutting DF at O ; make DE equal to DO ; draw Eh parallel to AB , and gb perpendicular to AB ; then gb is the representation of the line required.

PROB. IV. Fig. 6.

To find the orthography of a line inclined to the primitive, given the seat of the line and its inclination to the primitive.

Let $g'b'$ be the seat of the line; draw $g'p'$ perpendicular to $g'b'$; and make the angle $g'b'p'$ equal to the inclination of the line with its seat: find g the orthography of g' , and b the orthography of b' , by problem I.: also find gp the orthography of the perpendicular $g'p'$, and join pb ; then pb is the representation of the inclined line as required.

PROB. V. Fig. 7.

A parallelogram being given in the primitive, to find the representation of the parallelogram.

Let $g'b'i'k'$ be the original parallelogram.

Find g the representation of g' , by problem I.; produce $g'b'$ to meet the intersection AB in l ; also produce $g'i'$ to meet the said intersection in o ; join gl and go ; produce $b'i'$ to meet AB in m , also produce $k'i'$ to meet it in n ; draw mb parallel to lg , cutting og at b ; also draw nk parallel to og , cutting lg in k , and mb at i , then $gbik$ is the orthographical representation of $g'b'i'k'$.

In the same manner, the orthography of any plane figure in the primitive may be found, by producing the sides of the original figure.

PROB. VI. Fig. 8.

To find the orthography of a circle, draw the diameters $i'l$ and $b'k'$ of the circle, the one parallel and the other perpendicular to AB , the intersecting line; find il and bk the orthography of these diameters; and il and bk will be the two axes of the ellipsis, which is the orthographic representation of the circle.

PROB. VII. Fig. 9.

To find the orthography of a rectangular prism.

Find the representation $gbik$ of the base by problem V.; then find gl the representation of a line perpendicular to the primitive, by problem III.; draw km, io, hu , parallel to gl ; through l draw lm parallel to gk , cutting km at m ; and ln parallel to gb , cutting hn at n : lastly, draw mo parallel to ln , and no parallel to lm ; and $ikmlnubi$ will be the orthography of the solid.

PROB. VIII. Fig. 10.

To find the orthography of a right pyramid.

Find $gbik$ the representation of the base $GHIK$, by problem V.; find o the representation of O , the seat of the apex, by problem I.: lastly, find gm the representation of

the axis, by problem III., and join mk, mi, mb ; then $kimbk$ is the representation of the pyramid.

If the primitive and the plane of projection are at a right angle, the base of the object will be projected into a straight line, and all lines that are perpendicular will have their representations also perpendicular, and in height equal to that of the original solid.

Fig. 11. is the representation of a rectangular prism, fig. 12. that of a pyramid, fig. 13. the representation of a cylinder, and fig. 14. the representation of a cone, where the primitive and the plane of projection are at a right angle to each other.

Upon this simple principle the method of drawing plans and elevations depends.

PROB. IX. Plate II. fig. 1.

To find the orthography of any polygonal figure, the intersecting line, II , being given.

Let the polygon be a regular hexagon, $ABCDEF$; produce the side AF to meet the intersecting line in i' ; also produce AB to meet II in i'' ; find the point a , the orthography of A , by problem I.; draw the diagonals AC, AD, AE , to meet II in i^3, i^4, i^5 ; join ai' and ai'' ; draw Bb perpendicular to II , cutting ai'' at b , then b will be the representation of B ; also draw Ff perpendicular to II , cutting ai' at f , and f is the representation of F ; therefore, ab and af are the representations of AB and AF ; join ai^3, ai^4, ai^5 ; draw bc parallel to ai^4 , cutting ai^5 at c , and fe also parallel to ai^4 , cutting ai^3 at e ; draw ed parallel to ab , cutting ai^4 at d , and cd parallel to af ; then $abcdeaf$ is the orthography of $ABCDEF$.

For, in the primitive figure, BC and FE are parallel to AD , and the opposite sides are parallel; therefore, in the representative figure, bc and fe are parallel to ad or ai^4 , and the remaining sides are parallel to their opposite sides.

PROB. X. Fig. 2.

Given the projection of an angle of a pentagon, and the projected length of one of the sides containing the angle, to find the orthography of the whole figure, the intersecting line being given.

Let II be the intersecting line, cab the projected angle, and ab the projected side; produce ab to meet II at i^2 , and ae to meet II at i' ; on $i'i^2$ describe the segment $i'Ai^2$ of a circle, to contain the angle of the two sides of a pentagon; that is, 108 degrees; draw aA perpendicular to II , cutting the arc $i'Ai^2$ at A ; join Ai', Ai^2 ; draw bB parallel to aA , cutting Ai^2 at B ; then upon AB describe a pentagon, which will be the primitive figure; find the representations of the remaining parts as in the preceding problem, and $abcdea$ will be the orthography required.

PROB. XI. Fig. 3.

Given the intersection and the inclination of a plane, and the projection of the intersection of that plane with another plane, and the inclination of the planes, to find the intersection of the second plane on the plane of projection.

Let AB be the intersection of the first plane on the plane of projection; and let AE be the projection of the intersection of the inclined planes. In AB take any point G , and draw GE perpendicular to AB , cutting AE at E ; produce AE to K ; make the angle EGF equal to the inclination of the primitive to the plane of projection; through E draw EH perpendicular to AE ; make EH equal to EF , and join HA ; draw EI perpendicular to AH , cutting AH at I ; make EK equal to EI , and join

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join BK ; make the angle BKD equal to the angle which the two planes make with each other; join DA , and DA will be the intersection of the second plane with the plane of projection.

PROB. XII. *Fig. 4.*

Given the intersection and inclination of a plane to the plane of projection, and the intersection of that plane with another inclined plane, and the angle which the inclined planes make with each other, to find the intersection of the second inclined plane with the plane of projection.

Let AB be the intersection of the first inclined plane with the plane of projection; and let AE be the intersection of the two inclined planes; draw EF perpendicular to AB , cutting AB at K ; make the angle FKG equal to the angle of the planes; make KG equal to KE , and draw GF parallel to AB ; draw DC perpendicular to AF ; make FD equal to FG , and join DA ; draw FI perpendicular to DA , cutting DA at I ; produce AF to H , and make FH equal to FI ; join BH , and make the angle BHC equal to the angle of the planes; then join CA , and CA is the intersection which was to be found.

PROB. XIII. *Figs. 5, 6, 7, 8, 9.*

To find the inclination of two adjoining planes of the regular solids.

Draw the base ABC , $ABCD$, or $ABCDE$, of the pyramid which forms one of the solid angles: draw the triangle BGC , the development of one of the sides of the pyramid; draw GF perpendicular to BC ; bisect the angle ABC ; and let the bisecting line meet GF in F , their point of concurrence; draw FH perpendicular to BF ; from B , with the radius BG , describe an arc, cutting FH at H ; draw FI perpendicular to BH , cutting BH at I ; in FB make FL equal to FI ; let FH and BC meet in M ; also let FH and BA meet in K ; join ML and KL ; then KL will be the angle of the planes as required.

As the sides of the tetrahedron are equilateral triangles, and as three of the triangles form each solid angle, both the base of the pyramid ABC , and the developed side BGC , will be equilateral triangles in *fig. 5*.

In the construction for *fig. 6*, as the sides of the hexahedron are squares, and as each solid angle is formed by three of the right angles, the base of the pyramid will be an equilateral triangle, and the vertical angle of the developed side will be a right angle.

In the construction for the octahedron (*fig. 7.*), as each side is an equilateral triangle, and as four of the angles of the triangle form the sides of the solid angle, the base of the pyramid will be a square, and the developed side will be an equilateral triangle.

In the construction for the dodecahedron, as each solid angle is formed by three planes, and as each of the planes is a pentagon, the base of the pyramid will be an equilateral triangle, and the vertical angle of the developed side will be equal to the angle formed by the two sides of a pentagon.

In the construction for the icosaedron (*fig. 9.*), as each solid angle is composed of five sides, and as all the sides of the solid are equilateral triangles, the base of the pyramid is a pentagon, and the developed side an equilateral triangle.

In the construction for the dodecahedron, the angle of the pentagon was found by dividing a circle into five equal parts, and joining the chords of two adjoining parts, as AB , BC , *fig. 8.* $N^{\circ} 1.$) Then, to obtain the vertical angle, draw AC as a base; bisect the angle ABC , which will also bisect the straight line AC in E ; make EF equal to the half of BC , $N^{\circ} 2.$ and draw FG parallel to BC , cut-

ting BD at G ; make EG , $N^{\circ} 2.$ equal to EG , $N^{\circ} 1.$; and in $N^{\circ} 2$ join GB and GC , which will give the vertical angle BGC .

PROB. XIV. *Fig. 13.*

To project the dodecahedron.

Find $abcde$ the orthography of one of the planes, by problem IX.; find the angle which two contiguous planes of the solid make with each other, by problem XIII.; find the intersection of each of the planes adjoining to the plane whose projection is found, by problem XII., and thus three of the arrises of the solid will be projected; then to project the planes adjoining the extremities of the arrises or edges ab , ac , aq , suppose that contiguous with ac , produce ed to meet the intersecting line $I'I'$ in i^5 , and produce ef to meet $I^3 I^3$ in i^6 ; join i^5, i^6 ; then having the projection of the angle def , and the projected lengths ed or ef of one of the sides, and the intersecting line $i^5 i^6$ of the plane of that side, find the orthography $defgb$ of the whole figure, by problem X. In like manner, find the orthography of the figures $mno pq$, $clkib$, and the representation of the solid will be completed.

This new method of projection is not only more perspicuous, and requires fewer lines in the construction than that used by Brook Taylor, &c., but is also of universal application in every position, without the principle of dividing a line into extreme and mean ratio.

Not only architectural designs, but machinery drawing, depend upon orthographical representation; it enables the architect, engineer, or mechanic, to construct the object intended to be executed. As drawings of every kind are greatly facilitated by a knowledge of the formation of bodies, so in drawing machines it is necessary to know the methods of representing any system of lines upon cylindrical and conic surfaces, as this knowledge will determine whether the lines represented are parallel to each other, or tend to a point.

In drawing of machinery, as in other kinds of orthographical representations, the object is represented upon two planes, one parallel, and the other perpendicular to the horizon.

As the faces of the different parts of a machine are generally in vertical planes parallel to each other, the elevation is also made on a vertical plane parallel to the faces of the work, or to the greatest number of faces, in order to facilitate the execution, as this position not only gives the altitude of the parts, but is also convenient in ascertaining the magnitude of lines in every direction in these planes, and the angles which the lines form with each other; for if the faces of the work stand at oblique angles with the projecting plane, there can be only one direction, namely, that of measuring in a vertical line, in which the true dimensions can be ascertained; every other will be fore-shortened, and the angles formed by the lines of representation will also vary from the original angles of the object.

As the axes of wheels are sometimes obliquely situated, it becomes necessary to represent them in various positions. The several kinds of representations are sections through the principal parts; as through the axis of a wheel, plans or horizontal projections, and elevations.

Though a plan and elevation are sufficient to construct any machine with proper attention, yet from the greater facility of comprehending the nature of the design, and applying the measures to practice, two elevations are sometimes given, particularly in a complex machine. One of these elevations expresses the parts in the longest horizontal dimension of the work, and the other represents the parts comprehended

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comprehended in the breadth or horizontal extension of the work.

In the representation of a machine, the wheelwork is the most difficult of any part, except when the whole of the surfaces of the wheel are planes, with two or more faces parallel to the projecting plane, and all the other surfaces perpendicular to the said plane, as in this case the boundaries of the parallel planes are represented by figures similar to the original faces, and the whole of the other surfaces are projected into straight lines or circles. This case is so very simple, as not to require any directions; but if the wheel or its faces have an oblique position to the projecting plane, several considerations are necessary to effect a true representation. A ground section through the axis of the wheel, placed at the required angle, with the intersection of the plane of elevation, and an elevation of the wheel on a plane parallel to the faces, will be required. It is likewise necessary to observe, that in this oblique projection all the parallel arrises of any original object are represented by parallel lines, and all equal distances in the original object are represented by other distances equal among themselves; also all straight lines whatever in the original plane, divided into parts, are represented by a series of parts respectively in the same proportion. The proportion of any line is to its original, as radius to the cosine of the inclination of the original line and the plane of projection. The representation of an original circle is an ellipsis; and as the plane of projection is vertical, the elevation of an ellipsis will be represented with its greater axis perpendicular to the intersecting line.

Having now premised a few of the leading principles, we shall proceed to the representations of wheelwork.

Example 1. Plate III.

Fig. 1, N^o 1, is the representation of the half of a water-wheel, on a plane perpendicular to the axis of the wheel. *F G H* is the arc of a circle representing the convex side of the ring; *I K L* is the arc of a circle representing the concave side; *I, H, L, M, N, O, P,* are the ends of the float-boards, fastened to the radiating pieces at the back, and the radiating pieces are fastened to the ring by mortise and tenon.

Fig. 1, N^o 2, is an elevation of the wheel upon a plane parallel to the axis; this shews the planes of the ring as straight lines; the float-boards are represented by *I, H, L, M, N, O, P,* which shew the radiating planes of the sides, and the outer edges which adjoin, and which range in a cylindrical surface.

Fig. 1, N^o 3, is an elevation of the wheel upon a plane inclined to the axis; but the axis, in all these three positions, is supposed to be in a plane perpendicular to the plane of projection. The intersection of this plane is represented by the straight line *E E E*.

In this it will be observed that all the circles are represented by ellipses, and that all the ellipses are proportional to each other, and the dimensions in the transverse axis are equal to those in the original object which they represent. The dimensions in the conjugate axis, *viz.* in the line *E E E*, are diminished in the ratio of radius to the cosine of inclination: *viz.* in all the planes which are perpendicular to the axis of the wheel. Therefore in *fig. 1, N^o 4,* draw any two straight lines, making any convenient angle with each other: make *E F* equal to the transverse axis of the greatest ellipsis, and *E G* equal to the conjugate in *fig. 1, N^o 3*; in *E F* make *E b* equal to the length of a float-board; bisect *E b* at *k*, and make *k i* and *k l* half the thickness of the ring; then *l i* will be the whole thickness: join *G F*, and draw *b m, i n, k o, l p*, parallel to *F G*, cutting *G E* at

m, n, o, p; then *E m* is the length of the float-board in the drawings, and *p n* is the thickness of the ring in the same, to be transferred to the line *E E E*; observing that the transverse axis is perpendicular to the line *E E E*.

In *fig. 1, N^o 3,* draw the two similar and equal ellipses which form the extremities of the outer edge of the float-boards, at the distance of *E m, N^o 4,* from each other about the same axis; these will contain the edges of the float-boards. One of these ellipses may be projected entirely round; as also the other in the same plane which forms the lower edges. The latter two ellipses will contain the ends of the float-boards which radiate to the centre of the wheel.

The edges of the float-boards ranging in the exterior cylindrical surface, might be found by drawing lines parallel to the axis from *I, H, L, M, N, O, P,* &c. *N^o 1,* to the corresponding letters *I, H, L, M, N, O, P,* &c. *N^o 3*; but this method, though simple, does not give sufficient accuracy at the extremities of the transverse axis.

In order to obtain greater certainty, let *A C B, N^o 5,* be a semi-ellipsis, equal to the half of the two ellipses which contain the edges of the float-boards, arranged in the exterior cylindrical surface of *N^o 3*; *A B* being the transverse axis, and *E C* the semi-conjugate: join *A C* and *C B*; bisect *A C* by a perpendicular *g 2*, cutting *A C* at *2*; make *2 g* equal to *2 A* or *2 C*. From the centre *g*, with the distance *g 2*, describe an arc *3 2 4*, intercepting *g C* and *g A* at *3* and *4*. Between the points of intersection divide the quadrant into as many equal parts as there are intended to be float-boards in a quarter of the wheel. Suppose it were required to place the first division at the point *I* of the ellipsis *A C B*; draw *I E*, cutting *A C* at *y*, and join *y g*, cutting the arc *3 2 4* at *r*; then the part of which the arc *3 2 4* is a multiple being retained, and beginning at *r* with that part as a radius, cut off the equal arcs *r k, k l, l m, m n, n o, o p, p q*; through the points *r, k, l, m, n, o, p, q*, draw *g y, g i, g s, g t, g u, g v, g w, g x*, cutting *A C* at *y, i, s, t, u, v, w, x*; through the points *y, i, s,* &c. draw the lines *E I, E H, E L,* &c. cutting the circumference of the semi-ellipsis at *I, H, L,* &c. and the parts *Q P, P O, O N,* will be obtained with the greatest certainty, as well as the representations of the angles *I E H, H E L, L E M,* &c. about the centre. Upon this principle the edges of the boards in the planes in which the ends of the float-boards are arranged, are found. The edges of the float-boards arranged in the cylindrical surfaces are all parallel to the axis; and the parts in the plane of position in which the axis of the wheel is posited are obtained from *N^o 4*.

The whole of this process is so very easy, that a little reflection will enable the reader to comprehend the principles clearly.

Example 2. In sphero-conic wheels.

Sphero-conic wheels are those of which the teeth project from the surface of a cone, and of which the working surfaces of the teeth tend to the apex of the said cone.

Hence the ends of the teeth of two wheels which work together will be found in a spheric surface, of which the apex of the cone is the centre of the sphere.

Fig. 2, N^o 1, is the section of a sphero-conic wheel *H I F E*, and *O P M L* the section of the opposite teeth; *G H E D*, and *N O L K*, the sections through the opposite parts of the ring.

Fig. 2, N^o 2, the orthography of the wheel upon a plane parallel to the circles which form the arrises of the ring, In *N^o 1* and *N^o 2,* the point *A* represents the vertex of the conic surfaces from which the teeth project; the line *R A,*

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N^o 1, represents the axis in the same straight line with the point A, N^o 2.

Fig. 2, N^o 3, is half the section of the wheel; fig. 2, N^o 4, is the orthography on a plane parallel to the axis; in N^o 3 and N^o 4, A B and A B are the axes parallel to each other; the points A, A, are in the perpendicular A A to A B.

Fig. 2, N^o 5, is a whole section of the wheel. N^o 6 is the orthography projected upon a plane oblique to the axis.

In N^o 2, N^o 4, and N^o 6, the edges of the teeth in the conic surface of contact terminate in the vertex A; and the edges in the two concentric conic surfaces, each perpendicular to that ending in the point A, terminate in the points B and C. These are all projected in the point A, fig. 2, N^o 2.

The three projections N^o 2, N^o 4, and N^o 6, have their axes in the same straight line, in order to find the representation of the teeth by drawing parallel lines to cut the representations of the corresponding circles.

In N^o 2, the representations of the original circles are also circles; in N^o 4 the representations of the original circles are straight lines; and in N^o 6, the representations of the original circles are ellipses. The section at N^o 4 determines the conjugate axis of each ellipsis, the transverse being equal to the diameters of the original circles.

PROB. XV. Plate IV. fig. 1.

Given the feat and altitude of a line on a plane, and the intersection of the plane with another plane, at a given angle, to find the sun's feat on the other plane, as also its angle of altitude.

Let A C, fig. 1, N^o 1 and 2, be the feat of the line; A B the intersection of the other plane. In A C take any point C; draw C D perpendicular to A C; draw C E perpendicular to A B, cutting A B at B. In N^o 2, draw C H perpendicular to B C; make C H equal to C D; make the angle C B G equal to M L K, N^o 3, the inclination of the planes; draw H G perpendicular to B G; make B E equal to B G, and join A E; then A E is the feat of the sun's rays on the other plane.

Draw E F perpendicular to A E; make E F equal to G H, and join A F; then E A F will be the angle of altitude of the line on the other plane.

In N^o 1, the two planes are at right angles with each other; in this case the problem may be constructed without the quadrilateral B C H G; thus, having drawn C E perpendicular to A B, cutting A B at B; make B E equal to C D, and complete the triangle A E F, as in N^o 2; then A E is the feat of the line, and E A F is the angle of altitude, as before.

This may easily be conceived, by supposing that upon the triangle A B C, N^o 2, the triangle A C D, and the quadrilateral B C H G, are raised perpendicularly, then C H and C D will coincide, and the point H will coincide with the point D; turn the triangle A B E upon A B, and the side B E, being perpendicular to A B, will describe a plane upon B E perpendicular to the plane A B C; and because B C and B E are in the same straight line, B C will be in that plane; and because the plane B C H G is supposed to be raised perpendicular to the plane A B C upon B C, the plane supposed to be described by B E will be in the same plane with B C H G, when raised perpendicularly to the plane A B C; therefore, move the plane A B E until B E coincide with B G, supposed to be raised with the plane B C H G; the plane A C D, the plane B C H G, and the plane A B E, being thus supposed to be raised, turn the plane

A E F round A E, until E F fall upon G H; then the point F will fall upon H; and the straight line A F will also be coincident with A D; for the triangle A E F will be at a right angle with the triangle A E B, therefore E F will be at right angles to the plane A B E.

PROB. XVI. Fig. 2.

Given the feat and altitude of the sun's rays on a plane and the angle which the feat of a line parallel to the plane of projection makes with the feat of the sun's rays, to determine the inclination of the plane of shade obstructed by the original line with the plane of projection.

Let A C be the feat of the sun's rays given upon the plane of representation; make C A D equal to the altitude of the sun's rays; draw C D perpendicular to A C; make C A B equal to the angle which the feat of the sun's rays makes with the feat of the original line, which occasions a plane of shade; from C draw C B perpendicular to A B, and C E perpendicular to C B; make C E equal to C D, and join B E; then C B E is the inclination of the plane required. Produce C B to F; make B F equal to B E, and join A F; then let the triangles C A D, C B E, B A F, be turned up, and A F and A D will coincide; and the triangle C B E will measure the inclination of the plane A B F to C B A.

This problem is of the utmost use in finding the shadows of parallel lines to planes in various positions, as also in finding the shadows of cylinders where the axis is parallel to the plane of projection; also in determining the points and lines of light and shade both in cylinders and cylindric rings.

PROB. XVII. Fig. 3.

Given the feat and altitude of a line; and the feat and altitude of the sun's rays, to determine the shadow of the line on that plane.

Let H E be the feat of the line; make the angle E H I equal to the altitude of the line, viz. of A B C, N^o 1; E being any point in H E; draw E I perpendicular to H E; draw E F parallel to the feat of the sun's rays; and draw E G perpendicular to E F; make E G equal to E I: make the angle E G F equal to the complement of the sun's altitude, and join H F, which will be the shadow of the line required.

This problem will be found of the greatest use in finding the shadows of objects upon inclined planes.

PROB. XVIII. Fig. 4.

Given the inclination of a line to two planes at right angles to each other, to find the feat of the line on each of the planes, and the intersection of the planes.

Let A B C, N^o 2, be the inclination or angle which the line makes with one of the planes, and D E F, N^o 3, the angle which it makes with the other plane.

From the angular point B, N^o 2, take B C of any length, and from the angular point E, N^o 3, take E F equal to B C. In N^o 2, draw C A perpendicular to A B, and in N^o 3, draw F D perpendicular to E D. In N^o 1, draw any line G K; and through G, any point in G K, draw H I perpendicular to G K; make G H equal to the sine D F of one of the angles of N^o 3, and G I equal to the sine A C of the other, N^o 2; from H, with the radius A B, N^o 2, describe an arc, cutting G K at K, and join H K and K I; then G K will be the intersection of the planes, and K H and K I will be the feats of the line on each plane.

In the following problems respecting shadows, two planes of

of projection are always supposed to be given, *viz.* the seat of the rays of light on each of the planes, and the intersection of the planes, unless it be otherwise announced.

Practical Examples of Shadows.

Ex. 1.—To find the shadow of a rectangular prism attached to a wall, one of the sides of the prism coinciding with the surface of the wall.

Let $H I K L M N$ (*fig. 5.*) be the plan, the straight line $H I M N$ that of the wall, and $I K L M$ that of the prism; and let $A B C D$ be the elevation of the prism, and $V W$ the intersection of the plane of elevation, and that of the ichnography parallel to $H N$ and $K L$ in the plan.

To find the shadow of any point B on the elevation, corresponding to L on the plan.

Draw the ichnography $L N$ of a ray of light; also from B draw $B F$, the elevation of the ray, at any given angle with the intersection $V W$; join $B L$; draw $F N$ parallel to $B L$, and the point F will be the shadow of the point B on the elevation.

In the same manner find E and G the shadows of the points A and C ; join $E F$ and $F G$, and $A B C G F E A$ is the shadow required. Or thus;

Find the shadow F of the point B as before: draw the indefinite representations $A E$ and $C G$ of the extreme rays; then because the arrises or edges of the prism are parallel to the wall, or to the surface on which the shadows are thrown, the representations of the edges of the shadows will be parallel to the representation of the arrises on the plane of elevation; therefore draw $F E$ parallel to $A B$, and $F G$ parallel to $B C$, and $A E F G C$ will be the edge of the shadow, as before.

Ex. 2.—The shadow of *fig. 6.* is found in the same manner as in the last problem; the body which throws the shadow being a prism, having its planes parallel and perpendicular to the surface on which the shadow is thrown; $A N M L C$ is therefore the outline of the shadow thrown by a prism, represented by $F G H I$ on the plan, and by $A B C D$ on the elevation. The figure here introduced represents a cantiliver projecting from a wall.

Ex. 3.—To find the shadow of a cantiliver formed as in the last example, the plane of elevation being placed obliquely to the surface on which the shadow is thrown.

Let $E F I L K$ (*fig. 7.*) be the representation of the surface on which the shadow is projected, placed obliquely to the line $V W$, the intersection of the orthographic planes; let $F G H I$ be the plan of the cantiliver, and let $A B C D$ be the elevation of the same; the points A and D on the elevation corresponding with the point H on the plan; and the points B and C corresponding with the point F on the said plan. The end of the cantiliver is represented by $D e f A$, and the root by $C g b B$; the point I on the plan being represented by g and b on the elevation, and the point F on the plan by B and C on the elevation. To find the shadow of any corresponding lines $F G$ and $B b$; draw $G L$, the parallel of the seat of the sun's rays on the plan, meeting the shadowed surface $E K$ in L ; draw $L m$ perpendicular to $V W$; from b , the corresponding point of G , draw $b m$ the elevation of the ray; join $B m$; draw $g o$ parallel to $B m$; draw $m n$ parallel to $A B$, and $n o$ parallel to $A D$; then $b m n o g$ will be the shadow required; for the representation of the two edges of the shadows are parallel to the representation of the two edges of the end of the cantiliver.

Ex. 4.—Let $A B D E$ (*fig. 8.*) be the intersection of any vertical surface on which a shadow is to be thrown; and

let $B C D$ be the plan of a triangular prism projecting from that surface; also let $G H I F$ be the elevation of the same; find $p n$ the shadow of the perpendicular line as before, and join $n G$, and $p n G$ is the shadow of the prism as required.

Ex. 5.— $G H I K L$ (*fig. 9.*) is the elevation of several rectangular prisms joined to each other in the form of a pediment; $G H I K L$ is the outline, and $l m n$ the inner line forming the tympanum.

$A B E F$ is the plan of the surface on which the shadow is to be thrown parallel to the intersecting line $V W$; $B C D E$ is the plan of the pediment, of which the line $C D$, representing the face, is parallel to $A F$.

Draw $G O$, $H P$, $I G$, and $n r$, the elevation of the rays; draw the ray $D v$ on the plan, meeting $A F$ at v ; draw $v P G$ perpendicular to the intersecting line, cutting the rays $H P$ and $I G$ of elevation at P and G ; draw $P O$ parallel to $G H$; then $G O P G I$ will be the extremity of the shadow, the same as in example 1. To find the shadows from the inner edges $l m$ and $n m$; make $n r$ equal to $G O$, or $H P$, or $I G$, as each of the points G , H , I , r , is equally distant from the surface; draw $r s$ parallel to $n l$, and $r t$ parallel to $n m$; and $s r t$ is the shadow from the under arrises of the inclined parts.

Ex. 6.—*Fig. 10.* is the shadow of several rectangular prisms crossing each other at equal angles; one of the faces of each is parallel to the plane on which the shadow is thrown, and also parallel to the plane of elevation; the opposite or parallel faces are attached to the plane on which the shadow is thrown, and, therefore, the other faces are perpendicular to the said plane. The shadows, therefore, are to be found in the same manner as in the last example, *viz.* by drawing indefinite rays from all the angular points on the elevation, and finding the length of one of them; then the rest is completed by parallel lines from the termination.

Ex. 7.—To find the shadow of a rectangular ring.

Find the point l (*fig. 11.*) the shadow of the centre k ; through l draw $O P$ perpendicular to $k l$; then with the radius of the interior circle describe the arc $W X U$, meeting the said inner circle in W and U ; also from l , with the radius of the exterior circle, describe the semicircle $O Q P$; draw $O M$ and $P N$ parallel to $l k$, and these lines will touch the circle in M and N ; then $M O Q P N$ is the exterior shadow required.

PROB. XIX.

To find the representation of the shadow on a prismatic solid, by a plane cutting the prism perpendicular to its arrises; given the elevation of the prism on a plane parallel to its arrises, and parallel to one of its sides; given also the figure of the plane which throws the shadow, with the section of the surfaces of the prism, on that plane; likewise the sun's rays both on the plane and on the elevation.

Place the figure of the plane and the elevation so, that any two of their corresponding points, or parts, may be in a line perpendicular to the intersection. Draw the representation of the rays from all the angular points on the figure of the plane to meet the sectional line of the prism; draw the corresponding representations of the rays on the elevation, and from the points where the representations from the angles of the plane meet the section, draw lines parallel to the representations of the arrises of the prism to cut the corresponding rays on the elevation; then by joining the successive points, the shadow which was required is determined.

PROJECTION.

Examples. Plate V.

Ex. 1.—Let $A B C D$ (*fig. 1.*) be the plane, and $E F, F G$, the interfections of two other planes at right angles to the plane $A B C D$, and let $K L N O$ be the elevation of the prism; the lines $O N, R M$, and $K L$, representing the arrifes corresponding to the angular points G, F, E , on the section, that is to say, the point G is in the same straight line with $O N$, the point F with $R M$, and the point E with $K L$. Also let $K L M R$ represent the plane which is parallel to the plane of elevation, and let $K P$ represent the line of interfection.

Make $K U$ equal to the breadth of the shadow at the bottom; draw the ray $D I$ on the figure of the plane; draw $D T$ perpendicular to $K P$, cutting $K P$ at T , and T will represent the point which throws the shadow on the elevation; draw $T Q$, the ray of the sun, on the elevation; $I Q$ parallel to $D T$, and $U S$ parallel to $K P$, cutting $R M$ at S ; join $S Q$; then $K U S Q V O$ will be representation of the shadow required.

The examples in this plate, as well as the five succeeding ones in the following *Plate VI.*, shew the forms of shadows on the roofs of buildings, from chimney shafts and dormer windows of various forms.

Ex. 2.—*Fig. 3.* shews the shadows of a chimney shaft upon the roof of a house, the sides of the chimney shaft being parallel and perpendicular to the front.

Ex. 3.—*Fig. 4.* shews the shadow of a chimney shaft upon a roof which has two inclinations, the sides of the chimney shaft being situated as in example 2. The principles of performing these two examples are the same as in the preceding problem, and as illustrated in example 2. under the said problem.

PROB. XX.

Given the sun's feat and inclination on the plane of the horizon, and the interfection of two planes at right angles with each other, and perpendicular to the horizon, to find the representation of the sun's rays on each of the vertical planes.

Let $A D$ and $D B$ (*fig. 2.*) be the interfection of the two vertical planes, and let $A B$ be the feat of the sun's rays on the horizon; make the angle $A B C$ equal to the angle of the sun's altitude; draw $A C$ perpendicular to $A B$, and $A E$ perpendicular to $A D$; make $A E$ equal to $A C$, and join $E D$, which will represent the ray of the sun, on the plane of which the interfection is $A D$.

Produce $A D$ to G ; make $D G$ equal to $A C$, and join $G B$; and $G B$ is the representation of the sun's ray, on the plane of which the interfection is $D B$.

This problem is necessary in the three preceding examples, when the feat and inclination of the sun is given on the horizon, in order to find the orthography of the ray upon both elevations; *viz.* upon the front and upon the end.

PROB. XXI.

To find the indefinite shadow of a line perpendicular to the horizon on an inclined plane, given the inclination of the plane to the horizon, and the feat of the sun's rays; the interfection of the inclined plane with the horizon being parallel to the interfection of the plane of representation and the horizon.

Draw any straight line $A B C$, *fig. 5, N° 3*: make $A B$ to $A C$, as the sine is to the cosine of the plane's inclination: make the angle $C A D$ equal that which the feat of the sun's rays makes with a line perpendicular to the interfection of the horizon and the plane of representation: draw $C D$

perpendicular to $A C$, and join $B D$; and $B D$ is the indefinite representation required.

PROB. XXII.

To find the shadow of a plane rectilineal figure intersecting another plane figure, a point through which the shadow is to pass on the plane which receives the shadow, and the orthography of the rays of the luminary, being given.

If the line which throws the shadow meets the interfection of the planes, draw a straight line from the point of concurrence through the given point, and the line thus drawn will be the indefinite representation of the shadow.

But if the line which throws the shadow does not meet the interfection of the planes, continue the line or the interfection of the plane, or both of them, as the case may require, to meet each other, and draw a straight line from the point of concurrence through the given point as before; and the line thus drawn will be the shadow as required.

PROB. XXIII.

Given the orthography of a determinate line, and the indefinite representation of its shadow, also the orthography of the sun's rays, to find the limits of the shadow.

From one or either of the terminations of the line, as the case may require, draw the orthography of a ray to cut or meet the indefinite shadow of the line, and the length comprehended between the point or points thus found in the shadow, will be the extremity, or will terminate the length as required.

Examples.

Ex. 1.—To find the shadow of a chimney shaft on the roof of a house.

Find the indefinite shadow of the vertical line $F L$, *fig. 5, N° 2*, thus:

Let $A C$, *fig. 5, N° 3*, be parallel to $F L$: find $B D$ as in prob. XXI.: draw $F O$, *N° 2*, parallel to $B D$, *N° 3*: now let the parallel of the orthography of the sun's rays be given: from L draw $L O$, the orthography of the sun's rays, and the point O is the termination of the shadow $F O$: produce $F G$ and $L M$ to meet each other in N : draw $O N$, and $O N$ is the indefinite representation of the shadow of the edge $L M$ of the top: draw the orthography $M Q$ of the ray parallel to $L O$, cutting $O N$ at Q : continue the interfection $G H$, and the edge $M L$ of the top, to meet each other in P : draw $Q P$, and $Q P$ is the indefinite representation of the edge of the top, and of the other vertical plane not seen: draw $H R$ parallel to $F O$, and $F O Q R H$ will be the shadow required.

Ex. 2.—*Fig. 6.* is the shadow of a dormer window with a rectangular front, and the top inclined towards the front: find the indefinite shadow $A G$ as in the last example, and the orthography $E G$ of the sun's rays, and join $B G$; and $A G B$ is the shadow required.

Ex. 3.—*Fig. 7.* is the shadow of a dormer window with a pediment top: find $A G$ the shadow of $A E$, as before: then $D E$ being the next line that projects a shadow, $A B$ is the interfection of the plane $A B C D E$; therefore, produce $D E$ and $B A$ to meet in F : join $F G$, which produce to H : find the termination H by the ray $D H$: and $A G H D E$ will be the shadow required.

N.B. If the lines $D E, E G$, had been in the same straight line, or had formed a saliant angle instead of a re-entrant one, the upper side of the shadow would have been the same as in the last example.

Ex. 4.—Fig. 8. exhibits the shadow of a dormer window with a femicircular head: find the shadow AI of the perpendicular line AF : let O be the centre of the femicircular head: draw DL to touch the head of the window at D parallel to the orthography of the sun's rays: draw OD perpendicular to DL , and D is the point of contact: let it be required to find the shadow of any intermediate point, E , of the arc of the circle: now AB is the intersection of the plane $ABCDEF$: therefore draw a chord EF , and produce AB and EF to meet each other in H : join HI : produce HI to K ; and draw the orthography EK ; and the point K will be the shadow of the point E : in like manner draw the chord DE , and produce DE and BA to meet each other in G : join GK ; produce GK to L ; and L will be shadow of the point D : draw a curve from the point I , through K to L , touching the straight lines AI and DL at the points I and L , and $AIKLD$ will be the shadow required.

Ex. 5.—Fig. 9. exhibits the shadow of a dormer window with a kirb-roof top: find the shadows M, K, I , of the points E, F, G , as in the last example; and $AIKMEFGA$ will be the shadow required.

It is hardly possible to conceive any method more expeditious than the present, of finding the indefinite representation of the shadow by producing the line which throws it and the intersection of the plane till they meet each other in the plane in which the shadow is thrown. This principle has never before been generalised, for though it was well known, that if the representation of the shadow of the extremity of a line projecting from a surface, and the representation of the intersection of that line with the surface was found, the representation of the shadow of the line would be determined by joining the representation of the point to the representation of the shadow; yet the method of producing the representation of each successive line, and the intersection of the plane which throws the shadow with the plane on which the shadow is to be thrown, or with the several planes on which the shadow is to be thrown, has never been known as a general rule. This method has great advantages over the common established one, which requires that the seat of every point of the line, or several lines, which throws the shadow, be represented in the plane or several planes on which the shadow is to be thrown, and also that the seat of the luminary be represented in the plane or several planes: this last mode is attended with great labour, when there are more planes than one.

It is true, that in perspective, when the vanishing line of a plane of shade is found, and the vanishing lines of the planes on which the shadows are thrown, the indefinite shadow of the line upon each plane will easily be found: but these vanishing lines are frequently inaccessible, and the construction of them is attended with great labour, and when more lines than one throw a shadow on several surfaces, the labour to find the vanishing line of each plane of shade, and the vanishing lines of the planes on which the shadows are thrown, is very great.

From the great importance of this method in the art of shadows, it will be proper to give a few more examples, in order to shew its universality and expedition.

Ex. 6.—Fig. 1. Plate VI. $N^{\circ} 1$ is the elevation of a prismatic object, as the walls of a building, which form two prisms attached to each other; the lower prism is terminated with an inclined plane in the manner of a roof. The plan, $N^{\circ} 2$, shews the end of the higher prism, to which the lower prism is attached, to be at an obtuse angle with the plane of the front.

Let the ray $BF, N^{\circ} 2$, be drawn on the plan from the corner B , to meet the side CD at F ; then F is the projected point of B on the plan: draw fg , the elevation of the point F , cutting the top of the lower wall at g ; draw lm , the elevation of the sun's ray, as in the preceding examples; produce the intersection hi of the inclined plane to meet the line bl , which projects the shadow in k : through the points k and g draw kgm , meeting the elevation of the sun's rays at m . Now, as the line lo of the top of the end of the prism projects the next shadow, produce lo and the intersection ib to meet each other in n ; draw mn , cutting the upper termination hq of the inclined plane at r ; and $fgmrhief$ will be the shadow required.

Ex. 7.—Fig. 2. $N^{\circ} 1$ is a plane figure representing the gable of a house, of which BA is the base; FG, GH, HU , are the intersections of several planes; FG , parallel to BC , is the intersection of a vertical plane, as the face of a wall; GH and HU are the intersections of two inclined planes, forming two sides of a kirb roof. Now, to find the shadow by the intersecting points of the lines which project the shadow with the plane on which the shadow is thrown, it is evident that the line BC will project a shadow on the plane whose intersection is FG parallel to FG ; and as $BC, N^{\circ} 2$, represents $BC, N^{\circ} 1$, draw pq parallel to BC , cutting the lower inclined plane at q . Then, supposing the side BC also to throw a shadow upon the lower inclined plane, produce its intersection $HG, N^{\circ} 1$, and the line BC , which throws the shadow, to meet in K ; produce $CB, N^{\circ} 2$, to k , and draw Kk parallel to BA , then through the points k and q draw qkr ; draw CC from $C, N^{\circ} 1$, to $C, N^{\circ} 2$, parallel to $BA, N^{\circ} 1$; from the point $C, N^{\circ} 2$, draw the elevation Cr of the sun's rays. $CD, N^{\circ} 1$, is the next line which throws the shadow still upon the lower inclined plane; therefore, produce CD and GH to meet each other in M ; draw Mm parallel to BA , cutting BC at m ; draw also the indefinite shadow rm , cutting the intersection of the two inclined planes at $s, N^{\circ} 2$; then the line CD will also project a shadow upon the upper inclined plane; therefore, produce HU and $CD, N^{\circ} 1$, to meet each other in N ; draw Nn parallel to BA , cutting BC at n ; draw the indefinite shadow sn ; then $d, N^{\circ} 2$, being the corresponding point of $D, N^{\circ} 1$, draw the elevation of the ray $dt, N^{\circ} 2$, and the point $t, N^{\circ} 2$, will be the shadow of $D, N^{\circ} 1$. $DE, N^{\circ} 1$, is the next line that projects a shadow, and U is the intersection of DE and HU , and u the corresponding point to $U, N^{\circ} 1$; therefore join tu , and $Bpqrsttu$ will be the shadow required.

Ex. 8.—Fig. 3. represents an example similar to *fig. 1*, but with two inclined planes; the plan is here omitted, as it is only used in the projection of the first ray; the ray GL , parallel to AB , is drawn at pleasure at any distance from FH , to meet the intersection HP of the two adjoining planes in L ; produce IH to meet the line AB , which throws the shadow in D ; draw DL , and produce DL to S : draw the elevation of the ray BS ; then BC is the next line which throws the shadow: produce BC and HI to meet each other in E ; draw the indefinite shadow SE to cut the intersection IQ of the two inclined planes at M ; then BC will also project a shadow upon the upper plane; therefore, produce BC , and the intersection IK of the upper plane, to meet each other in T ; draw the indefinite shadow MT , cutting the top KR at N ; then $FGLSMNK$ will represent the projection of the shadow by the edges AB, BC , of the plane ABC , as required.

This figure may either represent the vertical plane ABC ,

PROJECTION.

or perpendicular to the first vertical plane F O P H, according as the sides are parallel or oblique to the plane of representation.

Ex. 9.—Let A B C D E (*fig. 4.*) be the figure of a gable, K L M N the upright of a wall, A B the base of the gable, N M the base of the wall; and suppose that the edge B C is joined to N K at any given angle, so that the point B may coincide with the point N. Now let it be required to find the shadow of the gable A B C D E upon the wall K L M N, the side B C of the gable being placed parallel to the edge N K of the wall.

As the vertical sides A E and B C of the gable are parallel, the shadow thrown upon the plane K L M N will also be parallel to the edge N K; therefore, taking N g at pleasure, draw g b parallel to N K; then e being the corresponding point of E, draw e b the elevation of a ray of the sun, and the point b will be the shadow of the point E. E D being the next line that projects the shadow, produce E D and B C the intersection of the plane to meet in F; find f the corresponding point of F, and draw the indefinite shadow b f; find d the corresponding point of D, and draw the elevation d i of a ray, cutting b f at i; C being the concourse of the line which throws the shadow with the intersection B C of the plane, find c the corresponding point of C, and join c i; then e i g b is the shadow of the lines A E, E D, and D C.

Ex. 10.—A B C D E (*fig. 5.*) represents the gable of a building as in the preceding example, S T U V the upright wall and inclined side of a roof, F G and G I the respective intersections of the wall and the roof: then, supposing the edge E D of the gable to be attached to S b, it is required to find the form of the shadow; the intersection F G of the plane being parallel to A B, the breadth of the shadow will also be parallel; therefore, taking the distance S n upon S V at pleasure, draw n o parallel to S T; then b being the corresponding point of B, draw the elevation b o of the ray. B C being the next line which projects the shadow, produce the intersection F G to meet B C in L; find l the corresponding point of L, and draw the indefinite shadow o l, cutting b W at p; B C now projects the shadow upon the inclined plane; therefore, produce the intersection G I, and the edge B C that throws the shadow, to meet in K; find k the corresponding point of K: through k and p draw the indefinite shadow k p q; c being the corresponding point of C, draw the elevation c q of a ray; find i the corresponding point of I; join i q, which completes the shadow on both planes.

PROB. XXIV.

A cylinder being capped with a square abacus, jutting alike over each side of the cylinder, to find the representation of the shadow; the elevation and plan being given, as also the plan and elevation of the sun's rays.

Let A B C D (*fig. 6. N° 1.*) be half the plan of the abacus, E F G half the plan of the cylinder, H I J K the elevation of the same, and L M N O that of the abacus, to project the shadow of any point p' in the elevation of the abacus, p being its corresponding place on the plan; draw the plan of the ray p q, meeting the semicircumference E F G at q; also from p' draw the indefinite elevation of the ray p q; and draw q q' parallel to I J or H K, and q' will be the shadow of the point p'. Find as many other points as may be necessary in the same manner; then, through all the points thus found, draw a curve, which will be the shadow required.

If the ray R T be drawn to touch the circle in V on

the plane, and if V' V'', the elevation of V, be drawn, then V' V'' will be the line of separation of light and shade.

If the rays of the sun be in two planes, one perpendicular to the plane of representation, but inclined 45 degrees to the horizon, and the other equally inclined to the horizon and to the plane of representation; that is to say, making 45 degrees with each; then all the points q' will be in the circumference of a circle, whose diameter is equal to the representation of the diameter of the cylinder.

Fig. 6, N° 2, shews the elevation completely shadowed.

PROB. XXV.

A cylinder being capped with another concentric cylinder, to find the representation of the shadow, *fig. 7, N° 1.*

Proceed to find all the points q' as in the last problem, and a curve being traced through the points q' will give the shadow required.

The point p' on the elevation, corresponding to p on the plan, may be thus found. Draw B R parallel to A C, and A R perpendicular to A C; draw p S parallel to A R, cutting B R at S. In L M make L p' equal to R S, and p' will be the corresponding point of p. N° 2. shews the elevation completely shadowed.

PROJECTION of the Sphere is the representation of all its circles upon a plane, either by rays proceeding to a given point, or parallel among themselves, passing through all the points of these circles till they are intercepted by the said plane.

When the rays are all parallel, the representation may be formed by the rules of orthographical projection: we shall take this case first.

PROJECTION of the Sphere, Orthographic. In orthographical projection, when the rays fall upon the plane of any circle, they will form a cylinder, and if the plane of the circle be parallel to the plane of representation, or in a subcontrary position, the projection of that circle will also be a circle equal to the original; but if the plane of the original circle be parallel to the projecting rays, the representation of the circle will be a straight line equal in length to the diameter of the original circle.

PROB. I.

Given the major axis A B, and a point C in the curve of an ellipsis, to find the minor axis, and thence to describe the curve.

Fig. 1. Plate VII. Bisect A B in E; through E draw F G perpendicular to A B; from C as a centre, with the distance A E or E B, describe an arc, cutting F G at H, and draw C H, cutting A B at I; make E F and E G equal to I C and F G, and F G will be the minor axis required.

This problem belongs to conic sections, but as its application is requisite in the following problems, it is here introduced.

PROB. II.

Given a great circle A B C of the sphere, and the orthographical representation of two points D and E, on the surface; to determine the intersection of a plane passing through the centre of the sphere, and through the original of the points D and E, with the plane of the circle given.

Through the points D and E (*fig. 2.*) draw A B; on A B, as a diameter, describe a semicircle A F G B; draw D F and E G perpendicular to A B: join F and G, and produce F G and A B to meet in H: draw H I, cutting the circle A B C in K; produce K I to meet the opposite circumference

circumference in C, and K C will be the diameter in which the plane will intersect.

Definitions.

1. A primitive circle is a great circle of the sphere, on which the representations of all the other circles are formed. The primitive circle is always supposed to be given.

2. A point is said to be drawn in projection, when the intersection of a straight line with the primitive is given, by drawing the line from the given point in the circle to be projected perpendicular to the primitive.

Hence, if two points be given in the projection of a great circle, the whole circle will be determined, since the centres of all great circles pass through the centre of the sphere; every great circle must, therefore, pass through the centre of the primitive; three points will therefore be given, by which the original circle can be determined.

PROB. III.

Given two points D and E in the projection of a great circle, to find the representation of the circle.

Find C K, (*fig. 3.*) the intersection of its plane, by problem II., and C K is the major axis of the ellipsis which represents the original circle. There is now given the major axis C K, and a point D or E, in the ellipsis; the minor axis L M being found according to problem I., the ellipsis C L K M may be described by the same, and the curve thus drawn will be the orthographical representation required.

PROB. IV.

Given the projection of a great circle of the sphere, and the point of projection of the intersection of that circle with another circle, and the inclination of the planes of these two circles, to find the representation of the other circle.

Let C L K M (*fig. 4.*) be the projection of the circle given, and let the point F be the projection of the intersection of the two great circles. Join F I, and draw F N perpendicular to F I, cutting the primitive A B C in N; produce I F to O, and draw N O perpendicular to I N; through O draw P Q perpendicular to I O; produce I K to meet P Q in R, and produce I O to S; make O S equal to O N, and join R S; make the angle R S T equal to the inclination of the planes of the two great circles, and let S T cut P Q in T; join T I, cutting the circle in U; produce U I to meet the opposite side of the circumference at V; then describe the representation of a great circle, by problem III., upon U V, as a transverse axis through the given point F in projection; and the original of the representation, U W V X, will form the given inclination R S T, with the original of the circle represented by K M C L, and these two original circles will pass through the original of the point F, as was required.

It is evident that I F will be the seat of the common axis of the two great circles, because the original axis passes through the point I; and because the pole is in the common axis, and F is the seat of the pole, therefore F is the seat of another point in the axis. Again, because F I passes through the centre, and F N is perpendicular to F I, let F I be produced to meet the opposite parts of the circumference in Y and W; then Y N W will be a semicircle: if this semicircle be turned round Y W as an axis, the semicircumference will describe the spheric surface, and F N will describe a lesser circle of the sphere perpendicular to the plane of the primitive; let the semicircle Y N W be turned round its diameter Y W, until its plane become perpendi-

cular to the primitive, then the straight line F N will be perpendicular to the primitive, and the point N in the perpendicular F N will be in the intersection of the two great circles in the surface of the sphere. Again, because N O is perpendicular to I N, and I N represents the axis; N O is a section of a plane perpendicular to the axis, and P Q is also a section made by the plane: but O S is equal to O N, and C R is the section of the plane of the great circle and the primitive; let the triangle I N O be raised upon I O, perpendicular to the plane of the primitive; also let the triangle T S R be turned round P Q, until O S coincide with O N, then the point S will fall upon N, and the axis I N will be perpendicular to the plane of the triangle R S T from the point S: now since R C and T V are the intersections of the planes of the original circles, and because the plane R S T is perpendicular to the axis, the angle R S T is the measure of the inclination of the planes.

PROB. V.

About a given point E, as a pole, to draw the representation of a circle, at a given distance from the pole.

Join E I, (*fig. 5.*) and draw E F perpendicular to E I, meeting the circumference of the primitive in F, and join F I; make F G and F H equal to the distance of the original circle from the pole; join G, H, cutting I F at O, and draw G K, O N, and H L perpendicular to I E, cutting I E at K, N, and L: make N P and N Q each equal to O G or O H; on P Q and K L describe the ellipsis P K Q L, which will be the representation required.

By this problem all the parallels of latitude may be drawn, and by problem IV. the meridians may be described; these two problems will, therefore, be sufficient to represent all the principal circles of the sphere.

By this kind of projection, either the convex or concave side of the sphere may be represented; this choice is peculiar to the orthographic projection; but in both these projections the circles will be inverted in respect of each other, since to project each, the eye must be turned on contrary sides of the surface, that is, to the convex and concave sides.

Example.—*Fig. 6.* shews the application of the preceding problems in the orthographic projections of the sphere; the first meridional representative circle is drawn according to problem III., the second according to problem IV., and all the remaining circles in succession, according to the same problem. The parallels of latitude are all drawn according to problem V. The objections to the orthographic method of projection are, that the distances of all the representative parallels of latitude are unequal from the pole, and the distances from all the representative meridians are also unequal as they are reckoned from one parallel of latitude to another, that is, as they are measured upon any such parallel; and that the representative angles continue to increase by inequality from the line of position on each side of it to the circumference of the primitive circle.

PROJECTION of the Sphere by the Rules of Perspective.—Let the primitive circle be called the plane of projection or picture, and let the centre of the primitive be also denominated the centre of the picture. The position of any circle to be projected is determined by a diameter of the primitive, and a straight line at right angles therewith. The eye is supposed to be fixed in this straight line, at a given distance from the centre, in order to view the circle to be projected. The eye and the given diameter of the primitive are supposed to be in a plane, both perpendicular to the primitive and to the original circle to be projected, and to pass through the centre of the said circle.

PROJECTION.

Definitions.

1. The plane passing through the perpendicular in which the eye is fixed, and through the given diameter, is called the vertical plane, or plane of position.

2. The given diameter is called the diameter of position, and produced to any indefinite length, is called the line of position: this diameter is, therefore, the intersection of the primitive and the vertical plane.

3. A great circle of the sphere in the plane of position, having a common centre with the primitive, is called the vertical circle.

In the practice of representing a circle of the sphere, the plane of position is folded upon the plane of the primitive circle, and, consequently, the circumference of the circle of position will coincide with the circumference of the primitive circle.

The position of the original plane to the plane of the picture is determined by producing the chord, which is the diameter of the circle to be projected, and the line of position, till they meet each other; and the angle thus contained is the inclination of the planes.

The distance of the centre of a vanishing line is determined by drawing a straight line through the point of light, parallel to the diameter of the circle to be projected, until it meet in the line of position.

PROB. I. Method 1.

To project any oblique circle of the sphere, the eye being at any given distance from the primitive.

Let $ABCD$ (*fig. 7.*) be the primitive and the circle of position, and AC their common diameter, in which is the centre O ; through O draw the straight line EBD perpendicular to AC , and let FG be the diameter of the circle to be projected; draw EF , cutting AC at f , and EG , cutting AC in g ; produce FG and AC , till they meet in H ; through H draw TU parallel to DB , and produce CA beyond each extremity towards I and N ; draw EI parallel to HF ; make HK equal to EI , HL equal to HG , and HN equal to HF . Upon LN , as a diameter, describe the circle $LMNP$; TU being the intersecting line of the plane of the original circle; $LMNP$ the original circle itself, placed in its real situation; and HK the distance between the vanishing line, that is, from the eye to the centre of the vanishing line; and K the prime directing point: therefore, bisect fg , which is one of the axes in u ; through u draw mp parallel to TU ; draw KM and KP tangents to the circle, cutting TU at R and S ; draw Rm and Sp perpendicular to TU ; then mp and fg are the two axes, by means of which the curve, which is the representation of the circle required, will be described.

Method 2. Without using the directing point.

Fig. 8.—The same lines and point being used as before, except the original circle and directing point, and FG being found as before; bisect GF , the diameter of the original circle, in Q ; from Q , with the radius QG , or QF , describe the semicircle GNF ; bisect fg at u ; through u draw mp parallel to TU ; draw Eu , which produce to meet GF in K ; draw KN perpendicular to GF , cutting the circumference of the semicircle at N ; in TU make HL and HM equal to KN ; draw MI and LI , cutting mp in m and p ; then fg and mp are the axes, as before.

Method 3. By the vanishing and intersecting lines.

Fig. 9.—The same lines and points standing as in the preceding method, excepting the semicircle GNF , the straight line EK , the points L and M in the intersecting line TU , and the axis mp of the representative circle; bisect GF in Q , as before; in TU make HR and HS equal to QF or QG ; draw RI , HI , and SI ; through I draw the vanishing line WX , which is in course parallel to TU ; make HZ equal to HQ , and IW equal to IE , and draw ZW , cutting RI at b , HI at q , and SI at d ; parallel to TU draw ba , bi through q , and cd from c ; the points a, b , being in SI , and the points i and c being in RI ; let ab and dc cut HI respectively at f and g ; then $abcd$ represents a square, circumscribing the original circle; therefore draw the diagonal ac , and draw the ellipsis $gbfi$, which is the representation of the original circle.

PROB. II.

To find a representation of a great circle of the sphere.

Let AC (*fig. 10.*) be the diameter of position, as before, and GF the diameter of a great circle in the vertical plane, which will therefore pass through the centre O ; and the plane of the great circle itself will intersect the primitive in the diameter BD , which is common to both, to the vertical circle and to the primitive, whether these two circles are coincident or placed at any angle with each other; and as BD will be at right angles to AC , the points B and D are points in the representative circle; draw EF , cutting AC in f ; produce EG and AC to meet each other in g , then gf is one of the axes found as before; the axis gf and a point B or D in the curve being given, describe the ellipsis by problem I. *Orthographical PROJECTION.*

PROB. III.

To find the measure of the arc of an original circle, represented by the part ab of the representative circle $fmgp$.

Draw Eg and Ef (*fig. 11.*); produce E to F , and Eg to G , and join GF ; bisect GF in Q ; draw EQ , cutting fg in q ; and draw qa , which produce to meet TU in J ; also draw qb , which produce to meet TU in K ; then if HQ be taken as radius, HK will be the tangent of the angle represented by the portion gb of the representative circle; also HJ , the tangent of the angle represented by the portion ga of the same. But the parts ga and gb make the whole representative arc ab , therefore the whole angle will be found by its tangents thus: draw HL perpendicular to TU ; make HL equal to HQ ; join JL and KL , and KLJ will be the measure of the arc represented by the curve AB .

Demonstration.—For TU is the intersecting line of the plane, and J and K are the intersecting points of the lines represented by qa and qb ; but the lines qa and qb are the representations of the radii. Now the point L , in the original plane, is the original of the centre; therefore JLK is the angle formed by the radii of the original circle.

If the measure of the angle bqc , which represents the supplement of the angle represented by bqa , be required; produce JL to M , and KL is the measure of the angle represented by bqc .

PROB. IV.

To find the original measure of any arc of a representative great circle.

Let

Let $BfDg$ (*fig. 12.*) be the representative great circle, of which it is required to find the original part ab .

Let AC be the diameter of position, and GF the diameter of the great circle in the vertical plane.

Produce CA to Z ; draw EI parallel to GF , meeting CZ in I ; make IZ equal to IE ; draw Za and Zb ; produce Za to meet the primitive in A' , and Zb to meet it in B' ; then will $A'B'$ be the original arc represented by ab .

Again, let it be required to find the arc represented by the portion ij of the other semicircle; draw Zi , cutting the opposite part of the primitive in I ; also draw Zj , cutting the opposite part of the primitive in J ; then IJ is the original of ij , as was required to be done.

Demonstration.—For BD is the intersecting line, and WX the vanishing line; I is the centre of the vanishing line, Z is the place of the eye in the vanishing plane, and $B'GBIJD$ is a circle in the original plane; therefore a is the representation of the point A , according to the principles of *perspective*; which see.

This method, which is entirely founded on the principles of Brook Taylor, has never before this, to our knowledge, been applied to the projection of the sphere, (and so far it is new,) not even by authors who have professed to give complete treatises on perspective. The rule is quite universal, so that it may be used to any distance of the eye whatever; whereas, in the common method, by finding the poles in the stereographic projection, the eye must be confined to the surface of the sphere; or in other words, the pole will not be the point from whence two lines may be drawn, that will intercept corresponding parts of the original circle, and its representative. This problem, moreover, shews the vast superiority over particular methods, which require so much trouble to perform.

PROB. V.

Given the angle which the intersection of the plane of a great circle, and the vertical plane, make with the line of position, and the inclination of the plane of that great circle with the vertical plane; to find the intersection of the great circle on the plane of the primitive.

Let AB (*Plate VIII. fig. 1.*) be the line of position, passing through the centre O of the primitive; and let AOC be the angle which the intersection of the plane of the great circle, and the vertical plane, make with the line of position. From any point C in OC , draw CD perpendicular to OC , cutting AB produced in D ; produce BD to F ; make DF equal to DC ; through D draw GH perpendicular to BF ; make the angle BFI equal to the inclination of the plane of the great circle with the vertical plane, and let FI meet GH at I ; draw IK through O , cutting the primitive in J and K ; and JK is the intersection of the great circle required.

PROB. VI.

Given the inclination of the planes of two great circles, intersecting each other in the vertical plane, the angle which their common intersection makes with the line of position, and the inclination of one of them with the said vertical plane; to find the intersection of the other great circle.

Find the intersection JK of the plane of the great circle, of which its inclination is given to the vertical plane, as in the preceding problem; make IFL equal to the inclination of the two great circles, and let FL cut HG at L ; draw LN through the centre O , cutting the primitive in M and N ; then will MN be the intersection required.

Corol.—Hence, in a series of great circles, intersecting each other in one common diameter in the vertical plane, if the successive inclinations of each two adjoining ones are given, the angle which their common intersection makes with the line of position, and the inclination of one of them with the vertical plane, each successive intersection will be formed by this problem. The present figure shews the intersection of the planes of twelve great circles placed at equal angles, *viz.* that of any two adjoining circles with that of any other two adjoining circles.

PROB. VII.

Two lines tending to an inaccessible point being given, through a given point to draw a third that shall tend to the same point.

Let FP and DH (*Plate VIII. fig. 1.*) be two straight lines, which approach nearer together towards the parts P and H , than at F and D ; and let O be the point through which the other straight line is to be drawn. Join OF , cutting DH in D , and draw PHQ parallel to OF ; find a fourth proportional to FD , DO , PH ; and make HQ equal to the fourth proportional; draw OQ , and OQ is the line required.

This problem is useful in the construction of the two last problems, where the distances of the points of concurrence of the lines forming the angles with the line GH , might be so great as to render the drawing of the radial lines from O impracticable; it is, therefore, introduced in order to remedy this inconvenience.

The diagram, $N^o 2$, shews the construction of finding PH , as is generally done by means of a triangle.

PROB. VIII.

Given the angle which the common intersection of a great circle, and the vertical plane, make with the line of position, and the intersection of the plane of the great circle, to find the inclination of the said plane to the plane of the primitive.

Let AB (*fig. 2.*) be the line of position, CD the intersection of the great circle, cutting each other at the centre O . Make BOG equal to the angle which the common intersection of the great circle and the vertical plane make with the line of position. In OB , or OB produced if necessary, take any point F , and draw GF perpendicular to OF ; produce OF to H , and CD to I , if necessary, and draw FI perpendicular to CI ; make FH equal to FI , and join GH ; then FHG will be the inclination of the plane of the great circle to the plane of the primitive, as was required.

Fig. 3. shews the inclinations of the planes of a series of great circles to the plane of the primitive, the planes being supposed to have a common intersection through a straight line in the vertical plane, and form equal angles with each other.

PROB. IX.

Given the intersection of a great circle, the inclination of its plane to that of the primitive, and the distance of the eye, to find the representation of the great circle.

Method 1.

Let CD (*fig. 4.*) be the intersection given; produce CD to E ; make OE equal to the distance of the eye; through the centre O draw FG perpendicular to CD ; make the angle OEG equal to the inclination of the plane of the great circle to the primitive; draw GH parallel to DC ;

PROJECTION.

DC; make GH equal to GE, the distance of the eye; join DH, cutting FG at I; join also CH, and produce CH to F, and FI is the minor axis; then, having the minor axis FI, and a double ordinate CD, describe the elliptic curve by problem I. *Orthographic Projection of the Sphere.*

It is evident, that DC is the intersecting line of the plane of the great circle, and GH the vanishing line of that plane; the method of finding the representation of the great circle is therefore reduced to a common perspective problem.

It most frequently happens in practice of the projection of the sphere, that the part of the great circle within the primitive, is all that is required to be represented. The following methods, by finding points in the curve, are very eligible for the purpose.

Method 2.

Let GH (*fig. 5.*) be the vanishing line, found as before; and since EC is the intersecting line, the semicircle CAD may represent the circumference to be projected, as well as the semicircumference of the primitive, for the two may now be supposed in a state of coincidence. Let CAD, therefore, be supposed to be the semicircumference of the great circle to be represented. To find the representation *a*, of any point A in the original circle, draw GI perpendicular to GH; make GI equal to GE; through the original point A draw AB, meeting the intersecting line EC at any angle; through I draw IH parallel to AB; join H, B and I, A cutting HB at *a*; then *a* is the representation of the original point A. And in this manner, as many points may be found as will be sufficient to draw the curve.

Method 3. Without the original circle.

Let GH (*fig. 6.*) be the vanishing line, as before; make GH equal to GE, the distance of the vanishing line, GOB being supposed to be previously drawn; join HD, and produce it to B; join also CH, cutting GB at A; through A draw FG parallel to D, and draw DF and CG parallel to AB; divide DF into any number of equal parts, say three; also divide DO into the same number of equal parts, *viz.* three; draw the lines MA, NA; draw also BO and BP; produce BO to meet MA at *q*, and BP to meet NA at *r*, then *q* and *r* are points in the curve. In the same manner the curve AC may also be drawn, which completes the lower semicircle. And thus having a diameter AB, and double ordinate, the curve is described.

Again, if it were required to represent the semicircle next to the eye, it is only dividing DO in the same manner, that is, the division will stand for both; then drawing a line parallel to AB, and another parallel to DO, to meet the line parallel to AB; divide the line parallel to AB into three equal parts, *viz.* into the same number as D; draw lines through the points of division as before, which will give the representation of one of the upper quadrants: the other will be found in the same manner, and thus the whole curve is found geometrically.

PROB. X.

Through a given point P, to draw the representation of a great circle making a given angle with the vertical plane passing P.

Join OP, (*fig. 7.*) and produce it both ways to S and N; draw DE perpendicular to SN; make OE equal to the distance of the eye; draw EP, which produce to meet the circumference in L; join LO, and produce LO to meet the circumference of the primitive in M; draw EM to meet SN at S; draw LX perpendicular to LM, cutting

SN at X; through X draw UV perpendicular to SN; make XN equal to XL. From N, as a centre, with the radius XN, describe the arc WXY; make the angle XNZ equal to the inclination of the vertical plane passing through P with the plane of the great circle to be projected, and let NZ cut UV at Z; draw ZO, cutting the circumference of the primitive in Q; produce QO to cut the opposite part of the same in T; through P draw ZK; then describe an ellipsis through the three points S, T, Q, to touch the straight line KZ at P, and the curve PQRS thus described will be the representation of the great circle required.

Demonstration.—Because SN is the intersection of the vertical plane passing both through the original pole and its representation P, L will be the original pole; and because LM is a diameter of the vertical circle, M will be the other original pole. And because both the projected poles must be in the straight line NS, at right angles to ED, EM being drawn will project the other pole M at S. Now the vertical plane, with all the lines and points therein, being turned round SN perpendicular to the primitive, and a plane being supposed perpendicular to LN passing through the pole S, this plane will be perpendicular to the vertical plane; and since the primitive, by supposition, is also perpendicular to the vertical plane, the intersection of the plane thus touching the pole and the primitive will be perpendicular both to the intersection of the vertical plane with the primitive, and the intersection of the vertical plane with the plane touching the pole; and because the point X is the intersection of the plane touching the pole and the primitive on the vertical plane, therefore the point X is common to the three planes; and therefore UV, passing through X perpendicular to SN, is the common section of the plane touching the pole and the primitive. Let the triangle XNZ be turned round XZ, then XN will describe a plane perpendicular to the primitive, and NS will be the intersection of this plane and the primitive, therefore the line NK will be in the vertical plane. Now, because XN is equal to XZ, let the triangle NXZ revolve upon XZ, until XN coincide with XL, and the point N will fall upon L; and thus XN, coinciding with XL, will be by supposition perpendicular to LO; and therefore the plane XN will be perpendicular to LM. But the measure of the inclination of two planes is the angle contained by the common section of these two planes with a third plane perpendicular to both planes; and because each of these planes intersects UV at Z and X, and the primitive at O, OZ and OX will be the sections of these planes with the primitive; therefore the points Q and T will be the sections of the circle in the plane whose section is TZ, and consequently the representation of that circle will also pass through the points Q and T; but it will also pass through the representative poles S and P; and because UV is the intersection of a plane drawn through the pole L perpendicular to the axis LM, every line drawn from L to the intersection UV will be perpendicular to the axis LM, and will touch the surface of the sphere at L. But P is the representation of the original pole L, and Z is the intersection of a tangent from L; therefore ZP is the representation of a tangent at P, and consequently the representation will pass through the points Q, S, T, and touch the straight line KZ at P.

By this problem all the meridians of the sphere may be drawn, so that their planes may be at given angles with each other, and may be regulated by the first, which may be called the primary projection of the meridian.

Scholium.—In order to save trouble, and yet preserve sufficient accuracy, the following observations will enable the

student to simplify the operation, when only the portion T P Q is required.

The ellipsis which is the representation of the great circle, has its minor axis passing through the centre O perpendicular to T Q, and its major axis parallel thereto; therefore a perpendicular drawn from the point O, will cut the curve T P Q into two equal and similar portions; consequently, if two straight lines be drawn from the line T Q perpendicular thereto, and equally distant from the centre O, till they are intercepted by the curve, these two intercepted perpendiculars are equal to each other: therefore from P draw P a perpendicular to T Q, cutting it in a; in O T make O b equal to O a, and draw also b c perpendicular to T O: make b c equal to a P; then, through the points T, c, P, Q, draw a curve to touch K Z at P, and this curve will represent the semigreat circle of the opposite hemisphere, sufficiently near for the purpose of constructing any map. The points T, c, P, Q, are equivalent to five points, as the tangent at P is equivalent to two.

But if greater accuracy still be required, the curve may be traced round to the representative pole S, which will shew more of the ellipsis, and consequently the degree of curvature required in the various points of the representation.

PROB. XI.

To find the representation of a circle in a plane perpendicular to the plane of projection, given the intersection of the circle, and the distance of the eye.

Method 1.

Let C D (*fig. 8.*) be the intersecting line, E the place of the eye; it is evident that since the plane of the original circle is perpendicular to the plane of projection, the vanishing line A E will pass through the centre of the primitive circle, parallel to the intersecting line C D. Make O E equal to the distance of the eye from the plane of projection; draw P L through O perpendicular to A E; join E D, and produce E D to L; join also E C, cutting P L at J; bisect C D in F. Take any vanishing point v^1 ; draw $v^1 F$, which produce to H; make $v^1 I$ on the vanishing line equal to $v^1 P$; draw I D, and produce I D to H; join C I, cutting $v^1 H$ at G, then G H is the representation of a diameter of the original circle. In the same manner, by taking any vanishing point v^2 and the distance $v^2 z$ equal to $v^2 P$, the diameter I K will be obtained; and as many diameters in the same manner, as will give a sufficient number of points for drawing the curve representing the original circle.

Method 2.

Fig. 9.—The intersecting line C D, the line of position O L, and the distance O E of the eye, being given as before, join E D, which produce to L; join also C E, cutting O L in J; then will the minor axis J L, and the double ordinate C D, describe an ellipsis by problem I. *Orthographic Projection of the Sphere*; and the curve will be the representation of the circle required.

Scholium.—The preceding problems shew several steps, in order to obtain a complete projection of all the circles of the sphere. By problems V. and VI. the intersections of all the great circles on the plane of the primitive are obtained. By problem VIII. the inclination of any plane may be found to the plane of the primitive, by the intersection of the plane and distance of the eye being given. By problem IX. the representation of any great circle may be obtained, when its intersection, the distance of the eye, and the inclination of the great circle to the plane of the primitive, are given. The same method may also be

employed in finding the representation of a small circle. By problem X. the representations of circles perpendicular to the plane of projection are obtained.

Examples constructed on the foregoing problems.

Example 1.—*Plate IX. fig. 1.* is a projection of the meridians upon the plane of a meridional circle. In this the common axis falls into the plane of projection. The distance of the eye is three-fourths of the radius from the sphere. From the choice of this particular distance, the meridians will divide the diameter of position into equal parts very nearly. The figure also shews how each ellipsis is described by means of the axes. The representations for one half of the lower hemisphere are only shewn; the other half being the same, except that each is opposite to its correspondent.

Ex. 2.—*Fig. 2.* is a projection of the parallels of latitude upon the plane of the meridian, the distance of the eye being the same as in example 1. This figure shews the manner of describing the ellipses by their axes; the curves divide the circumference into equal parts, and also the diameter very nearly.

Ex. 3.—*Fig. 3.* is a complete projection of both the meridians and parallels of latitude upon a meridional plane, which combines both the first and second examples. The circumference of the primitive is divided into equal parts, by the representation of the parallels of latitude; the diameter A B is divided into equal parts very nearly, by the same curves; and the diameter C D into equal parts very nearly, by the meridians.

Ex. 4. *Fig. 4.* represents a projection of the sphere, as in *fig. 3*; except that in *fig. 3*, all the circles of the sphere are elliptical, whereas in this figure they are circular; the diameters A B and C D being equally divided, as well as the circumference. This is what the constructors of maps are pleased to call the *globular projection* upon the plane of a meridian. Though this construction answers to the equality of parts in the circumference and diameters of *fig. 3*, yet the curves being all arcs of circles, are not in truth projections; the deformity in the compartments, particularly at the circumference, and near the pole, is obvious, when compared to the true projection, *fig. 3*.

Ex. 5.—*Fig. 5.* is a projection of the circles of the sphere upon the plane of the equator, the distance of the eye being the same as above, namely, three-fourths of the radius; the parallels of latitude divide each of the radii, which represent the meridians, into equal parts very nearly. This is what map constructors term the *globular projection* on the plane of the equator. Though constructions, as in *figs. 4*, and *5*, are sufficiently near for practical purposes, the principle can only be obtained from the preliminary problems necessary in the construction of *figs. 1, 2, and 3*.

Ex. 6.—*Fig. 6.* shews the projections of the meridians, and all the parallels of latitude, according to the general principles of *perspective projection*; the distance of the eye from the plane of the projection, or primitive circle, being three-quarters of the radius, as in the preceding examples. The meridians are all projected according to problem IX.; and as they are at 15° distant from each other, answering to hour circles, the first meridian is described according to the angle which it is required to make with the vertical plane, and all the remaining meridians at 15° from each other, beginning from the first on each side of it, and ending in 90° . The semicircle is thus divided into 12 equal parts, which give 24 angles at the pole in projection; and as all these pass through the centre of the primitive, they divide the remote concave semicircumference, as well as that of the nearer converse half. All the parallels of latitude are projected according to problem I.; the distances of the parallels

parallels are 10° from each other, and are set off on the circumference from the pole on each side of it. By the choice of distance of the eye from the primitive, as employed in this example, the parallels of latitude are nearly at equal distances, reckoned along any straight line drawn from the pole; and the same distance will nearly take place, by producing the straight line upon the opposite side, as far as 40° , where indeed no more can be drawn upon the semicircle, which contains the pole. The picture here shewn is as near the true figure as can be delineated on so small a scale.

This projection ought to be employed, instead of what is improperly called the globular, which in fact is founded upon no principle of projection whatever. The choice of distance, which obtains this equality of division, is founded upon Rhenaudin's property of the circle, which gives nearly equal parts upon the diameter. In short, we do not recollect any other projections made upon what is called the globular method, than those upon the meridian and equator, where, in the former case, the poles are in the primitive circle, and in the latter, in the centre of that circle; so that the globular method, which is only confined to these two cases, is a mere imitation of perspective representation, the distance of the eye being three-fourths of the radius from the surface of the sphere. The only argument that can be used in favour of the globular method is, that circles are much more easy to describe than ellipses; but if *ellipsographs* were brought to general use, they might be described with considerable expedition, and the compartments of the projection would be less distorted.

This is the first specimen that has come to our knowledge of the application of the general principles of perspective to the projection of the sphere, in which pure geometrical principles only have been employed by any English author. It is hoped that the perspective student will reap considerable advantage from this application, in being able to generalize the science. The ingenious Mr. Martin, in his *Mathematical Institutes*, has given some algebraic rules, whereby certain points may be found by calculation; but such cannot be of any use to the student: for though, in an abstract point of view, the result by calculation is complete, or, if in some cases not quite exact, the error may be so reduced as to be less than any assignable difference from truth; yet to apply the numbers thus resulting from the arithmetical operation, recourse must be had to a scale, in order to convert the number into measure, the accuracy of which must then depend upon the division of the scale, and the eye of him who takes the extent as pointed out by the number. The error in this way, when such distance is transferred to the drawing, will in general exceed that occasioned by the obliquity of intersections, besides being more liable to mistake; nor could a drawing be made entirely by calculation, as the time required would exceed all comprehension. This may, therefore, satisfy a few, whose curiosity leads them to delight in nothing but what comes to them in the symbolical language of algebra, but cannot be of the smallest service to the practical student.

PROJECTION of the Sphere, Stereographic. The stereographic projection of the sphere is a perspective representation of all the circles upon the plane of the primitive, the eye being confined to the surface of the sphere at the extremity of a radius perpendicular to the plane of the primitive.

The reader who has made himself master of the science of perspective, and its application to the projection of the sphere, as shewn by the preceding article, will, of course, be able to represent any circle of the sphere stereographically;

but when the eye is brought to the surface of the sphere, certain properties take place, which considerably abridge the labour; one of the most remarkable of these properties is the following.

Theorem 1.—If in a circle (*figs. 7 and 8*), the diameters AG and HI be drawn at right angles, and if DB be any chord, and AB and AD be joined, then let AB cut HI at E , and let AD cut HI at F ; the triangle ABD will be similar to the triangle AFE .

Demonstration.—Join BC ; and because the angle ABC is in a semicircle, it is a right angle; and because the angles ADB and ACB at the circumference stand upon the same base AB , they are equal: and also in the triangles AGE and ABC , the angle CAB is common, and each of the angles ABC and AGE a right angle, therefore the remaining angle AGE of the triangle AGE is equal to the remaining angle ACB of the triangle ACB ; but the angle ACB is equal to the angle ADB ; therefore the angle ADB is equal to the angle AEG ; and because the triangles ADB and AEG have the angle DAB common, and the angle ADB equal to the angle AEG , the remaining angle ABD of the one is equal to the remaining angle AEG of the other; therefore the triangle ABD is similar to the triangle AEG , which was to be proved; and thus also the triangle ABD is subcontrary to the triangle AEG .

Theorem 2.—If from any point A (*fig. 9.*) in the circumference of a circle $AFBG$, a straight line AB be drawn to meet the circumference in B , and if through the point B , a tangent CD be drawn; and if the radius AE be also drawn, and the diameter FG perpendicular to AE , cutting AB in H ; then if GF and DC be produced to meet each other in C , then will the angles CBH and CHB of the triangle CBH be equal to one another.

For DBI is an angle formed by the chord BI and a tangent DB , and the angle BAI is formed in the alternate segment, therefore the angle DBI is equal to the angle BAI ; and because the triangles AEH and ABI are right-angled at E and B , and the angle at A is common to both, the triangle AEH is similar to the triangle ABI ; therefore the angle AHE is equal to the angle AIB ; but the angle CBA is formed by the tangent BC and the chord BA , and BIA is the angle in the alternate segment; therefore the angle CBA is equal to the angle BIA ; but the angle BIA was shewn to be equal to the angle AHE ; therefore the angle AHE is equal to the angle ABC ; but the angles AHE and CHB are opposite; therefore the angle CHB is equal to the angle AHE ; therefore, also, the angle CHB is equal to the angle CBH , which was to be proved.

Scholium.—By theorem 1. it is evident that every circle of the sphere will also be represented by a circle, for the cone of rays will be cut subcontrary. The advantage is very great both in point of accuracy and expedition, in having only to draw circles instead of ellipses. By the second theorem it is evident that the angles which original circles form with each other, will be represented by equal angles; that is, every representative angle will be equal to its original. This is the reason why this particular distance of the eye is to be preferred in the practice to a greater, which, though less distorted, is more laborious and more liable to inaccuracy.

Theorem 3.—If in the circle $AJIH$ (*fig. 10.*) the diameters AI and JH be drawn at right angles, and if OD be any radius of the circle, and AD be joined, and if

AD and OH be produced to meet each other in C , and if AB be drawn perpendicular to OD , meeting OC in B , then will BA be equal to BC .

For, draw AF parallel to JH , and then the angle AED is the angle in the alternate segment, therefore the angle FAD is equal to the angle AED ; because OD is perpendicular to AB , or to the chord AE , AE is bisected; because GA is equal to GE and GD perpendicular to AE , and the angles DGA and DGE are right angles, the triangle DGA is equal and similar to the triangle DGE ; therefore the angle DEG is equal to the angle DAG ; but the angles FAD and DCB are alternate, therefore the angle FAD is equal to the angle DCB ; but the angle DAG is equal to the angle DEG , and the angle DAG is equal to the angle DAF , therefore the angle DAG is equal to the angle DCB , therefore BA is equal to BC .

This theorem shews the coincidence of the general method of projecting the sphere by the rules of perspective in finding the original measure of any representative arc with that of the stereographic projection of the sphere: for if A be considered as the place of the eye, D the pole of a circle to be projected, and if AD and JH be drawn to meet each other in C , it is evident that C is the projected pole of D , as shewn by the rules of stereographic projection. Now, by the rules of perspective, AB may be considered as the parallel of an original plane, whose pole is the point D , B the vanishing point of lines perpendicular to the intersection, and C the place of the eye in the vanishing plane.

Theorem 4.—The plane of every great circle of the sphere divides the primitive into two equal parts, or passes through a diameter.

Demonstration.—Every great circle passes through the centre of the sphere; therefore the planes of any two great circles will bisect each other: but the primitive is a great circle of the sphere, and its centre is the centre of the sphere; therefore the plane of every great circle of the sphere will pass through the centre of the primitive, and therefore through a diameter.

In the following problems the vertical plane is always supposed to pass through a diameter of any great circle to be projected, and therefore the line of position is the seat of that diameter; therefore the diameter itself will always be projected upon the line of position.

PROB. I.

To find the representation of the axes or poles of a great circle, the seat of the axis being given in the line of position, and the inclination of the axis to its seat.

Let $ABCDEF$ (*fig. 11.*) be the primitive circle, FC the diameter of position, and E the place of the eye, in the diameter EB , at right angles to FC .

Make COD equal to the angle which the axis makes with its seat, and produce DO to A , then AD is the axis; draw the visual ray EA , cutting FC in P ; also join ED , and produce ED and FC to meet in Q , then PQ is the representation of the axis, and consequently P and Q are the poles.

PROB. II.

To find the intersection of a great circle, given the line of position, the angle which the axis makes with the line of position, and the inclination which the plane of any great circle makes with the vertical plane.

Make COD (*fig. 12.*) equal to the angle which the axis makes with the line of position: from any point D

in OD draw DG perpendicular to OD ; produce OC to Q , and let OQ cut DG at G ; make GQ equal to GD ; through G draw JG perpendicular to OQ ; make GQJ equal to the inclination of the plane of the great circle with the vertical plane; through O draw JL , cutting the circumference in K and L , and KL is the diameter of the section required.

Corol. 1.—If the point D be in the circumference of the primitive, and if ED be produced to meet the line FQ , the point of concurrence will be at Q ; this appears from theorem 3, therefore the point Q is in the pole of the great circle.

Corol. 2.—If DO be produced to meet the opposite part of the circumference at A , and if AM be drawn perpendicular to AO , cutting OF produced at M ; and if through M , MN be drawn perpendicular to OM ; and if OM be produced to I , and if MI be made equal to MA , and KL be produced to N , and NI joined; and AE be drawn, cutting FC in P , and PN be joined, PN will be equal to NI : for MN and JG are at the same distance from the centre O , and are parallel to BOE , and the triangle MNI is equal and similar to the triangle GQJ , therefore MP is equal to MI . See Prob. X., *Perspective PROJECTION*, where it was shewn that PN is a tangent to the curve at the point N .

PROB. III.

To find the representation of a great circle or any portion thereof, the intersection and the common representative diameter being given.

Let KL (*fig. 13.*) be the given intersection, and PQ the representative of the axis.

Bisect PQ by the perpendicular TS , and draw OS perpendicular to KL ; from S , the point of concurrence of the lines RS and OS , with the distance SP or SQ , describe the arc $QKPL$, which is an arc of the representative of the great circle.

Demonstration.—For since the representation is a circle, and because it passes through the points K and L , the extremities of the intersection, the centre of the representation will be in the line OS : but the representation of the circle also passes through its poles P and Q ; therefore the centre will be in the line TS ; bisecting the representative axis PQ ; but it is also proved to be in the line OS , it will therefore be at the point of concurrence S of the lines TS and OS .

Corol.—Hence the centres of all the representative great circles which have PQ for their representative axis, will be in the line TS ; since every representative circle passes through the points P , Q , they must therefore be in the line bisecting PQ .

Definition.—The line TS , bisecting the axis PQ , is called the locus of the centres of all the great circles which have the same representative axis.

PROB. IV.

Given a common representative diameter of two great circles, and the intersection of one of them, to find the representation of the two circles, so that their original planes may have a given inclination.

Method 1.

Let PQ (*fig. 14.*) be the common representative diameter, and KL the intersection. Find RM the locus of the centres; join KL ; draw OS perpendicular to KL , meeting RM in S ; join SQ , and from S , with the distance SQ , describe the arc $QKPL$; make the angle SQR equal to the inclination of the planes of the two great circles from

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from R; with the distance R Q describe the arc Q M P N, then Q K P L and Q M P N will be arcs of the circles required.

Demonstration.—Join P R and P S, then P R will be perpendicular to a tangent to the arc M P N at the point P, and P S will be perpendicular to a tangent at the point P, in the arc K P L: but the tangents at the point P forms an angle equal to the original angle; therefore the lines P R and P S, which are perpendicular to these tangents, will form an equal angle: but the angle R Q S is equal to the angle R P S; therefore the angle R Q S is equal to the angle formed by the tangents of the two great circles, that is, equal to the inclination of their planes.

This method is exceedingly useful in describing the representations of great circles, which have a common representative diameter, with compasses; but in many cases it is impracticable, owing to the centres running out to distances without limit, and consequently beyond the reach of any radius: but in the representation of the sphere, seldom more is required than the part of the representation of the great circle contained within the primitive. The instrument called the cyclograph will be much better adapted to the description of the arcs required: we shall therefore construct the problem as adapted to the use of the cyclograph, which perhaps is the most convenient of any that could be used for the purpose.

PROB. V.

Given the angle which the intersection of a great circle and the vertical plane make with the plane of projection, and the inclination of the plane of the great circle and the vertical plane, to describe the representation of the great circle.

Let H C (*Plate X. fig. 1.*) be the line of position; through the centre of the primitive O, draw D E perpendicular to H C; make H O B equal to the angle which the common intersection of the vertical plane and the plane of the great circle make with the line of position, and let O B cut the circumference of the primitive in B; draw B G perpendicular to O B; and let B G meet H C in G; draw G J perpendicular to H C; make the angle G H I equal to the inclination of the plane of the great circle and the vertical plane, and let H I meet G J in I: draw I O, cutting the circumference in N; produce N O to meet the opposite side in M; join B E, cutting H C in P; through the point P, and upon M N as a chord, describe the arc M P N, thus: let A C, N° 2, be the chord, B the given point through which the arc is to pass; lay a straight edge B D upon the points B and A, and another, B E, upon the points B and E; fasten them together at B; then, supposing the angle D B E to be kept stationary while the two pieces are put in motion in the following manner, let the point B be brought to A, and B E laid upon C, and let a pencil be fixed at B; let the instrument be so moved, that B D may be always upon A, and B E upon C, and that the point B may describe a continued line from A to C, and the line thus described will be the arc of a great circle, as required.

Scholium.—By this method every great circle of the sphere may be represented one after the other, and the plane of the one to be projected may either make a given angle with that which is projected, or a given angle with the vertical plane. The projected circles make the same angle with each other at the point of intersection, or the tangents at that point, that the original planes make with each other: thus the projected circles M P N, K P L, or their tangents P I and P J, as I H and J H, which form the inclination of their planes, or the angle contained between the line of position P G, and

the tangent P J to the circle K P L, will be equal to the angle G H J.

PROB. VI.

Fig. 2.—About a given representative point P, to describe the representation of a circle of the sphere, of which the original shall have the original of P for its pole, and be at a given distance from P.

Join P O, and produce P O to A and B; draw O E perpendicular to A B; and make O E equal to the radius of the sphere; draw E P, and produce E P to meet the primitive in F; then F is the original pole: make F C and F D equal to the distance of the circle from its pole; draw the chord C D; draw C E, cutting A B at c; also draw D E, cutting A B at d; on c d, as a diameter, describe the circle c d e, which is the circle required.

Scholium.—By this problem the parallels of latitude may be described at 10° distance from each other, or at 10°, 20°, 30°, 40°, &c. from F.

PROB. VII.

The representation of a circle of the sphere being given, to find the representation of its pole.

Let c d e (*fig. 2.*) be the representation of the circle given; and let G be its centre; join G O, and produce G O to the primitive at A and B, and let A B cut the representative circle in c and D; join E c, and produce E c to meet the primitive in C; also join E d, and produce E d to meet the primitive in D; bisect the arc C D in F; draw E F, cutting A B in P, then P is the pole required to be represented.

Scholium.—This problem is the converse of the former; but when the circles are all parallel, they have one common pole.

PROB. VIII.

Given the representative of a great circle, to find the vanishing line of its plane, the place of the eye in the vanishing plane, and the representation of the centre of the circle.

Let E F G H (*fig. 3.*) be the primitive circle, and A K B D the representation of the circle of the sphere; join O C; draw O E perpendicular to O C; make O E equal to the radius of the sphere, and the point E will coincide with the primitive circumference; produce O C to B and P, cutting the representative circle in A and B; draw E A, and produce E A to meet the primitive circumference in G; also draw E B, and let E B cut the primitive circumference in H, as in N° 2, or produce E B to meet the primitive circumference in H, as in N° 1, and join G H; produce B A to P; draw E S parallel to H G, meeting B P in S, make S P equal to S E; through S draw V L perpendicular to B P; then V L is the vanishing line, and P the place of the eye in the vanishing plane.

Bisect H G in I; draw I E cutting A B in J; and J is the representation of the centre required.

Scholium.—This problem is general for all circles of the sphere, whether great or small; but in finding the representation of the centre of a great circle, the points I and J coincide in the centre O of the sphere; therefore, since H E G is a right angle, and because the points H, E, G, are in the circumference of the circle G E H, and H G is opposite to the right angle, H G is a diameter, which is, therefore, already bisected by the centre O.

The particular construction, which may, therefore, be necessary in N° 2, in order to find the vanishing line, the place of the eye in the vanishing plane, and the representation of the centre, may be as follows:

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Join OC ; draw OE perpendicular to OC ; make OE equal to the radius of the sphere; draw EA , and produce EA to meet the circumference in G : so far this agrees with the general construction, the difference takes place in the subsequent part. Join GO ; draw ES parallel to GO , cutting BP in S ; make SP equal to SE , then P is the place of the eye in the vanishing plane, VL the vanishing line, and O is the representative centre of the circle, represented by DEK .

PROB. IX.

Given the representation of a great circle, and a point in its circumference; from the given point to cut off a part of the said circumference, that shall represent a given portion of the original circumference.

Let $EFGH$ (*fig. 4.*) be the primitive circumference, and AKD be the representation of the great circle, as in the preceding problem; find the vanishing line VL , P the place of the eye in the vanishing plane, and J the representation of the centre by the said problem. Now let a be the given point; join Ja ; produce Ja to L ; join LP ; make the angle LPV equal to the angle contained by the radii drawn from the extremities of the arc to the centre of the original circle; that is, in the same proportion to four right angles, that the original arc is of the whole circumference of which it is a part; join VJ , cutting the circumference of the representative circle in b , then ab is the representative arc required.

Again, let it be required to represent an arc from the point c on the opposite part of the circumference of the representative circle; join cJ ; produce cJ to L ; join LP ; make the angle LPV as before, and join VJ ; produce VJ to meet the representative circumference in d ; then cd is the arc required.

Lastly, let it be required to represent an arc of the original from the point b towards c ; join bJ ; produce Jb to V ; join VP ; make the angle VPR the same portion of four right angles, that the original arc is of the whole circumference of the circle of which it is a part; join LJ ; produce LJ to c , and bc is the representative arc required.

PROB. X.

With the same data to find the original measure of any part of the representative circumference.

Let it be required to find the original measure of the arc represented by ab ; join aJ , and bJ ; produce Ja to L , and Jb to V ; join LP and VP , and the angle LPV will be the measure of the original arc required.

In like manner it will be found, that LPV is also the measure of the arc represented by cd ; and VPR is the measure of the arc represented by bc ; also OPL is the measure of the arc represented by ad .

Scholium.—These problems are derived from the general principles of perspective. Those who have acquired the elements of that science will be at no loss to comprehend the above. However, in the stereographic projection of the sphere, P is the external pole; therefore, if in $N^{\circ} 2$ lines be drawn from the point P , through the two points a and b , to meet the opposite side of the primitive circumference, the portion of the intercepted circumference will be equal to the original arc represented by ab ; even this method may be derived from the principles of perspective.

The point P , in $N^{\circ} 1$, is also the external pole of the lesser circle, but the original of the lesser circle cannot be obtained with the same facility. In this the intersecting line must be found; and the original circle requires to be put

in its place in the original plane, and then the corresponding parts will be found in the same manner.

With respect to $N^{\circ} 1$, the part ECG of the primitive is already the original of the representative part EAG .

PROB. XI.

Through a given point in the representation of the arc of a great circle, to describe the representation of the arc of another great circle, so that their original planes shall have a given inclination.

Let APB be the given arc, and P the given point, and let C be the centre of the arc APB ; draw PC and PO ; produce PO to H ; and draw CH perpendicular to PH ; produce HC to D , and make CPD equal to the inclination of the planes of the two great circles; from D as a centre, with the radius DP , describe EPG , then the original planes of the circles, represented by APB , EPG , will have the inclination required.

Demonstration.—For the locus of all the circles is in a straight line perpendicular to PO , the line joining the centre of the primitive, and the given point; therefore, if the centre of one of the circles be known, (which is always easy, when the circle or any arc of it is given,) the locus will be a perpendicular through that point; but C is the centre of the circle APB , and DH passes through C perpendicular to PO ; therefore DH is the locus of the centres; and because the tangents of these circles are perpendicular to PC and PD at the point P , CP will make the same angle with PD , that the tangents make with each other; but the angle formed by the tangents of these arcs is equal to the inclination of the planes of the original circles, therefore the representative circle APB is described according to the data, as required to be done.

Scholium.—By this problem the obliquity of the ecliptic may be represented at its proper angle with the equator; or in a spherical triangle an angle may be represented at a given point in the representation of one of its sides; the sides may be determined as in problem IV.; and thus all the cases in spherical trigonometry may be resolved by means of these two problems.

The following are examples shewing the use of the preceding problems in the stereographic projection of the sphere.

Ex. 1.—*Fig. 6.* Projection of the sphere on the plane of the meridian.

Ex. 2.—*Fig. 7.* Projection of the sphere on the plane of the equator.

Ex. 3.—*Fig. 8.* Projection of the sphere on the plane of the horizon.

This species of projection of the sphere is the most useful of all others, as it gives the angles equal to their originals, and as the measures of the angles and the different arcs concerned are so easily obtained.

As it is impossible to develop the surface of a sphere, so it is also impossible to represent its surface upon a plane without considerable distortion throughout the greater part of the representation, by any mode hitherto devised, or perhaps that can be devised. The original measures of distances and angles upon the surface of a sphere may, however, be obtained from any of the foregoing principles, as accurately as upon the sphere itself, and this is all that is indeed necessary in the solution of any question that may arise.

PROJECTION of the Sphere, Gnomonical.

Definition 1.—When the eye is placed in the centre of the sphere as a projecting point, and if from thence rays be drawn through every point of any circle of the sphere, till they are intercepted by a plane, the figure traced out by

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the intersection of the rays is called the gnomonical projection of that circle, or the circle is said to be projected gnomonically.

2. If the several circles of the sphere be projected gnomonically, the representation is called a gnomonical projection of the sphere.

3. If a straight line be drawn from the eye perpendicular to the plane of projection, until it meet the said plane, the point of concurrence with the plane is called the centre of projection, as in the stereographic projection.

4. If a plane be supposed to pass through the eye perpendicular to the plane of projection, and to the plane of any circle to be projected, the plane thus posited to each is called the vertical plane.

5. The intersection of the vertical plane, and the plane of projection, is called the line of position.

Theorem 1.—Any great circle of the sphere is projected upon a straight line in the plane of projection.

For the centre of the sphere is a point common to every great circle; but the eye is placed in the centre of the sphere, therefore the eye is in the plane of every great circle; and, consequently, every such plane will be projected into its intersection with the plane of projection.

Theorem 2.—The projecting rays passing through any small circle form the surface of a right cone. Since the eye is situated in the centre of the sphere, it cannot be in the plane of any small circle: and since the centre of the sphere, and the centre of a small circle, is in a straight line drawn perpendicular to the plane of the said circle, the rays proceeding from the eye to all points of the circumference of any circle will therefore form the surface of a right cone.

Theorem 3.—Every small circle of the sphere is projected upon a conic section. For the rays form the surface of a cone, and the surface of the cone of rays is terminated by the plane of projection; therefore the section of the intercepted rays will be a conic section, which will either be the ellipse, parabola, or hyperbola.

PROB. I.

Given the centre O , the line PO of position, the inclination of the intersection of a great circle of the sphere, and the vertical plane with the plane of projection, the inclination of the plane of the great circle with the vertical plane, and the radius of the sphere, to draw the representation of the great circle.

Draw OE (*fig. 9.*) perpendicular to PO ; make OE equal to the radius of the sphere, and OEP equal to the complement of inclination of the intersection of the great circle, and the vertical plane with the plane of projection; produce PO to C ; in PE take any point A , and draw AB perpendicular to PE , meeting PC at B ; make BC equal to BA ; draw BD perpendicular to PC , and make the angle BCD equal to the inclination of the plane of the great circle with the vertical plane; join DP , and produce DP to F , and the straight line DF will be the representation of the great circle required.

Scholium 1.—The greater part of this construction is independent of the projection of the sphere, as the same angle DPB , or the opposite one, GPF , would take place, whatever were the distance of the eye; the direct radial OE only determines the distance OP , which would otherwise be variable.

2. It is evident, that with the same data, except a change in the inclination of the plane of the great circle and the vertical plane, the straight line, which is the representation of the great circle, will always pass through the point P :

thus, if the inclination of several great circles of the sphere were BCH , BCD , BCI , BCJ , BCK , their respective representations would be HPQ , DPF , IPN , JPM , KPL .

3. It is also to be remarked, that if BP be the meridian of a place, and if the angle BPE be equal to the latitude, and the angles BCI , BCD , BCH , &c. on the one side, as also BCJ , BCK , &c. on the other side, be respectively 15° , 30° , 45° , &c. on each side, that is, each angle 15° ; then BG will be the 12 o'clock line, and all the others on each side of it the hour lines of a horizontal dial.

4. This construction is not only necessary in the gnomonic projection, but also in the orthographic and stereographic projections, in finding the intersections of all the great circles with the plane of the primitive.

5. The gnomonical projection of the sphere would be very eligible for general practice, if all the small circles could be projected with the same facility as the great ones; but as the small circles (excepting those that are parallel to the plane of projection, which are circles) are projected into ellipses, hyperbolas, or parabolas; it is generally confined to the use of dialling, where it is necessary that the hour lines should be straight, and where few curve lines are employed, seldom more than the solstices being represented.

PROB. II.

To project any small circle of the sphere, its diameter being given as a chord to the circumference of the vertical circle.

Let FG (*fig. 10.*) be the diameter of the circle to be projected, and Og the line of position; draw EO perpendicular to gO ; draw EF , EG ; produce EF to meet gO in F ; also let EG meet gO , if possible, in g ; bisect fg at j ; take half of the difference of the lines Ef and Eg , and set it in the major axis fg , from j to i , and from j to b ; then b and i are the foci of the ellipses; through j draw kl perpendicular to fg ; from i or b as a centre, with the distance ig or jb , describe an arc at l , and another at k , then kl is the minor axis; then about the two axes fg and kl describe the ellipses, and it will represent the circle required.

But if EG (*fig. 11.*) be parallel to Og , they will not meet each other: let this be the case, then the cutting plane will be parallel to the side of the cone, and consequently the projection of the small circle required will be a parabola; produce EF to meet gO in f , and take any distance, fi , for the abscissa of the curve; let kE bisect the angle FEG ; draw il perpendicular to Ek , cutting EG , produced at L , and the axis kE of the cone at k ; draw im perpendicular to il ; and through i draw nq perpendicular to if ; from k , with the distance kl , describe an arc, cutting im at m ; make in and iq each equal im ; then with the abscissa if , and double ordinate nq , describe a , the parabola, which will be the representation required. A very easy method of finding points in the curve is the following:—Draw no parallel to if , and of parallel to ni ; divide ni into parts of any proportion, say three equal parts, and through the points of division draw straight lines to cut the former parallels, and the points r, s , of intersection will be in the curve; therefore through the points n, r, s, f , draw a curve, which is the representation of the circle.

But if EG (*fig. 12.*) meet gO in P , the other side of the centre O , the representation of the circle will be a hyperbola; find the double ordinate nq , as in *fig. 11*; then with the double ordinate nq , and the abscissa if , and major axis fP , describe a hyperbola, which is the representation

representation required. The following method, by finding points in the curve, is very expeditious: divide ni into any number of parts of any proportion, say three equal parts; from the points of division draw lines to P ; divide no into the same number of parts of the same proportion; that is, because ni is divided into three equal parts, no will also be divided into three equal parts; through the points of division draw lines to f , and the points r, s , of intersection will be in the curve.

Scholium.—Though every kind of projection furnishes the means of ascertaining the distances and angles concerned in the same, and though the representation of the whole surface of the sphere by means of a projection is the most eligible method of all others; yet, when a small portion is required to be represented, the method of developing the surface is preferable, not only on account of the development being more nearly similar to the spheric surface itself, but also on account of the distances being obtained by inspection only, or from a scale of equal parts; and though this mensuration is only an *approximation* to truth, it is sufficient for common use.

The impossibility of forming a true development of the spheric surface has already been observed; if, however, the sphere be supposed to be circumscribed by a polyhedron, the side of the polyhedron, extended upon a plane, will be very nearly a true development of the surface.

In the approximating the development of the spheric surface, there are two different methods of considering the subject; one is, by supposing the polyhedral surface to consist of conic frustums, each touching the surface of the sphere in the middle; and the other is, by supposing the polyhedral surface to be composed of those of a cylinder, meeting each other in planes passing through the centre of the sphere, and intersecting each other in one common diameter, as an axis; and, because conic and cylindric surfaces are developable, the surface of the circumscribing polyhedron will also be developable; and, therefore, may be correctly represented. Now, supposing all the sides to be equal, and increased in number at pleasure, (the greater the number, the nearer will the surface of the polyhedron coincide with that of the sphere); and, consequently, any portion of the surface of the development of the surface of the polyhedron will be very nearly equal and similar to the corresponding portion of the spheric surface.

Each of these different methods of representing the spheric surface has its peculiar advantage and disadvantage, when applied to the art of map-making. The conic method of development is best adapted to represent countries to any extent, in the difference of longitude, or round the whole circumference of the earth, if required; to a certain extent in difference of latitude. And the cylindric method of development is well adapted to represent countries contained between any two parallels of latitude, but not to have any considerable difference of longitude.

Of these two different developments, the conic is attended with the least trouble, on account of the facility of describing the parallels of latitude in concentric circles, and the meridians in straight lines.

With respect to the application of the development of the conic surfaces in the construction of maps, a very excellent method is that given by the Rev. Patrick Murdoch, M.A., F.R.S., in vol. i. part. ii. of the Philosophical Transactions for the year 1788, read Feb. 9, as follows.

I. "When any portion of the earth's surface is projected on a plane, or transferred to it by whatever method of description; the real dimensions, and often the figure and position of countries, are much altered and misrepresented. In the

common projection of the two hemispheres, the meridians and parallels of latitude do intersect at right angles, as on the globe; but the linear distances are every where diminished, excepting only at the extremity of the projection; at the centre, they are but one-half their just quantity, and then the superficial dimensions but one-fourth part; and in less general maps, this inconvenience will always attend the stereographic projection.

"The orthographic by parallel lines would be still less exact, those lines falling altogether oblique on the extreme part of the hemisphere. It is useful, however, in describing the circumpolar regions; and the rules of both projections, for their elegance, as well as for their uses in astronomy, ought to be retained and carefully studied.

"As to Wright's or Mercator's nautical chart, it does not here fall under our consideration; it is perfect in its kind; and will always be reckoned among the chief inventions of the last age. If it has been misunderstood or misapplied by geographers, they only are to blame.

II. "The particular methods of description, proposed to be used by geographers, are so various, that we might, on that very account, suspect them to be faulty; but in most of their works we actually find these two blemishes, the *linear dimensions visibly false*, and the intersections of the circles oblique; so that a quadrilateral space shall often be represented by an oblique-angled rhomboid figure, whose diagonals are very far from being equal; and yet, by a strange contradiction, you shall see a scale of distances inserted in such a map.

III. "The only maps I remember to have seen, in which the last of these blemishes is removed, and the other lessened, are some of P. Schenk's of Amsterdam; a map of the Russian empire; the Germania Critica of the famous professor Meyer, and a few more. In these the meridians are straight lines, converging to a point; from which, as a centre, the parallels of latitude are described. But, as that rule appears to be only an easy and convenient approximation, it remains still to be enquired, *what is the construction of a particular map, that shall exhibit the superficial and linear measures in their truest proportion?* In order to which,

IV. "Let ELP (figure 13) be the quadrant of a meridian of a given sphere, whose centre is C , and its pole P ; EL, El , the latitudes of two places in that meridian, EM their middle latitude. Draw LN, ln , cosines of the latitudes, the sine of the middle latitude MF , and its co-tangent MT . Then, writing unity for the radius, if

in CM we take $Cx = \frac{Nn}{Ll \times MF \times MT}$, and through

x we draw xR, xr equal each to half the arc Ll , and perpendicular to CM ; the conical surface generated by the line Rr , while the figure revolves on the axis of the sphere, will be equal to the surface of the zone that is to be described in the same time by the arc Ll ; as will easily appear by comparing that conical surface with the zone, as measured by Archimedes.

"And lastly, if from the point t , in which rR produced meets the axis, we take the angle CtV , in proportion to the longitude of the proposed map, as MF , the sine of the middle latitude is to radius, and draw the parallels and meridians as in the figure, the whole space $SOQV$ will be the proposed part of the conical surface expanded into a plane; in which the places may now be inserted according to their known longitudes and latitudes.

V. "Let Ll , the breadth of the zone, be 50° , lying between 10° and 60° north latitude; its longitude 110° from 20° east of the Canaries, to the centre of the western hemisphere;

PROJECTION.

PROB. III.

hemisphere; comprehending the western parts of Europe and Africa, the more known parts of North America, and the ocean that separates it from the old continent."

As the rule here given by Mr. Murdoch would be attended with too much trouble, he proposes a shorter method for practice, in a note at the bottom of page 568 of the same vol. and part referred to; which is, "make Cx to CM as the arc ML is to its tangent, and finish the map."

Mr. Martin, in the second volume of his "Young Gentleman and Lady's Philosophy," has shewn a rule, derived from a very well-known principle of the centre of gravity, in order to obtain the distance Cx : the formula is $Cx =$

$$\frac{CM \times LB}{ML},$$

which is very convenient in practice. He

also gives an example, as applied to a map, in the same volume, which rule is thus:

"In this new map, the extent or difference of latitude is 50° , equal to Ll ; therefore $ML = 25^\circ = 2.6179$ inches to a radius of 6 inches. (See Inst. 885.) Also, the sine BL of the same arc is 2.5358 inches; therefore say,

$$\text{As the arc } ML = 2.6179 \quad - \quad 0.417953$$

$$\text{Is to its sine } BL = 2.5358 \quad - \quad 0.404099$$

$$\text{So is radius } CM = 6 \quad - \quad 0.778151$$

$$1.182250$$

$$\text{To the distance } Cx = 5.8116 \quad - \quad 0.764297''$$

The advantage gained by Mr. Murdoch's method of constructing maps is only in facility of description: for though the whole area is truly represented, yet the measures taken along the parallels of latitude are very incorrect, being no where equal to those of the sphere, except where the conic surface intersects that of the latter body. The conic meridians within the intercepted part are less than the true meridians, and those on each side of the intercepted part greater. This method, therefore, ought to be restricted not to exceed 30° of difference of latitude; and in this case, it would be much simpler to take the surface of the cone, a tangent to the sphere in the parallel circle of middle latitude.

From the rule which Mr. Murdoch gives for finding the vertical angle CtV , may be derived that of finding the vertical angle of development, in order to cover any portion of the surface of a cone; the side of the cone, the radius of the base, and the degrees contained in the circumference of the base being given, Mr. Murdoch's rule is,

As radius

Is to the sine of middle latitude,

So is the difference of longitude

To the vertical angle CtV .

But radius is to the sine of middle latitude, as the cotangent is to the cosine; therefore, as the cotangent is to the cosine of middle latitude, so is the difference of longitude to the vertical angle CtV . Now the cone, that would touch the sphere, has its side equal to the cotangent, and the radius of its base equal to the cosine; therefore,

As the side of the cone

Is to the radius of the base,

So is the number of degrees contained in the circumference of the base

To the vertical angle of development.

To construct a map upon the principles of development.

Let AJK (*fig. 14. N° 1.*) be a quadrant of a great circle of the sphere; divide the arc AJ into nine equal parts, and let $B, C, D, E, F, \&c.$ be the points of section; draw the radii $BK, CK, DK, EK, \&c.$ and the tangents $Bb, Cc, Dd, Ee, Ff, \&c.$ Now suppose it were required to draw a map of the whole hemisphere, or the half on one side of the equator, for want of room. Draw $ll, N° 2,$ and AJ perpendicular to ll ; make $AJ, N° 2,$ equal to nine times the chord AB , or BC , or $CD, \&c. N° 1$; from A , as a centre with the radius AJ , describe the semicircle lJl ; divide the radii, Al, Al , each into six equal parts; let $B, C, D, E, F, G, H, I,$ be the points which divide AJ into nine equal parts, and produce AJ to Z : in AZ , make Dd equal to $Dd, N° 1$; Ee equal to $Ee, N° 1$; Ff equal to $Ff, N° 1, \&c.$; and from the points, $b, c, d, e, f, \&c.$ as centres with the radii $Bb, Cc, Dd, Ee, \&c.$ describe the arcs $mm, nn, oo, pp, \&c.$; divide each of the arcs, $Bm, Cn, Do, Ep, \&c.$ into six equal parts, and through the corresponding points draw curves from the points of section in Al to terminate in J ; then the lines $mm, nn, oo, pp, \&c.$ will represent the parallels of latitude; and the other lines, which terminate in J , the meridians.

Another method, by which the parallels of latitude may be made to cut the circumference lJl perpendicularly, is the following: imagine straight lines to be drawn from the point l , and through the points $B, C, D, \&c.$ to meet the concave circumference in $m, n, o, \&c.$; then the tangents from the points $m, n, o,$ will give the centres. If any of the points, $m, n, \&c.$ are out of reach, each curve may be described through the three points $m, B, m,$ and $n, C, n, \&c.$ This process is even more accurate in distant latitudes than the former.

Scholium.—This is a very near development of the surface of the globe. All the meridians and parallels of latitude intersect each other very nearly at right angles; the successive quadrilaterals between any two meridians are nearly equal in area, and similar to those on the globe; and those adjoining the middle meridian AB are almost exactly the same as their correspondents. Every parallel of latitude is equally divided by the meridians, as they are on the globe; and every parallel, as terminated by two meridians on the map, is of the same length exceedingly near as the corresponding part on the globe itself. It must, however, be observed, that the meridians are here represented of different lengths, all longer than those on the globe, except AJ , the central one; but this is also the case with every kind of the projection of the sphere whatever: and in this respect it is even less defective, in the lengths of the meridians, than Murdoch's is with respect to the lengths of the parallels of latitude. However, since the middle meridian answers as a scale, the length of every meridian can be correctly ascertained. This map is perhaps, upon the whole, the most correct and the easiest to be constructed of any yet published. It may be employed in the construction of the largest maps, as well as in the smallest, and will be more exact as the difference of longitude is less.

In drawing a map of any particular country, the perpendicular AJ , or the diameter of which AJ is a part, must be taken as near to the middle of the country as possible, as the parts nearer to AJ are more exact than those which are more remote, and because all the degrees of latitude

tude are exactly equal upon the line AJ to those of the globe, and therefore any measurement with compasses can be more accurately ascertained.

For a farther account of gnomonic projection, see GNO-MONIC *Projection*, and DIALLING.

PROJECTION, *Mercator's*. See MERCATOR, and CHART.

PROJECTION of *Globes*, &c. See GLOBE, &c.

PROJECTION, *Polar*. See POLAR.

PROJECTION of *Shadows*. See SHADOW.

PROJECTION, in *Alchemy*, the casting of a certain imaginary powder, called *powder of projection*, into a crucible, or other vessel, full of some prepared metal, or other matter; which is to be hereby presently transmuted into gold.

PROJECTION, *Powder of*, or of the philosopher's stone, is a powder supposed to have the virtue of changing any quantity of an imperfect metal, as copper or lead, into a more perfect one, as silver or gold, by the admixture of a little quantity of it.

The mark to which alchemists direct all their endeavours, is to find the powder of projection; which every one of them has been within an ace of, a hundred times.

For the characters, properties, virtues, &c. of this powder, &c. see PHILOSOPHER'S *Stone*.

PROJECTION, in *Building*. See PROJECTURE.

PROJECTIVE DIALLING, a manner of drawing, by a method of projection, the true hour-lines, furniture of dials, &c. on any kind of surface whatsoever, without any regard to the situation of those surfaces, either as to declination, reclination, or inclination. See DIALLING.

PROJECTURE, in *Architecture*, the out-jetting, or prominency, which the mouldings and members have, beyond the plane or naked of the wall, column, &c.

These the Greeks call *ecphora*, the Italians *sporti*, the French *saillies*, our workmen frequently *sailings over*, and the Latins *proiecta*, from *projicio*, *I cast forward*; whence the English *projecture*.

Vitruvius gives it as a general rule, that all the projecting members in buildings have their projectures equal to their heights: but this is not to be understood of the particular members or mouldings, as dentils, coronas, the fasciæ of architraves, the abacus of the Tuscan and Doric capital, &c. but only of the projectures of entire cornices, &c. The great point of building, according to some modern architects, consists in knowing how to vary the proportions of projectures, &c. agreeably to the circumstances of the building.

Thus, say they, the nearness and remoteness, making a difference in the view, require different projectures; but it is evident the ancients had no such intention.

The projecture of the base and cornice of pedestals, M. Perrault observes, is greater in the antique than the modern buildings by one-third; which seems to follow, in good measure, from the ancients proportioning this projecture to the height of the pedestals; whereas the moderns make the projecture the very same in all the orders, though the height of the pedestal be very different.

The reason of this change, which the moderns have made of the antique, the same author refers to a view of the appearance of solidity.

PRO INDIVISO, in *Law*, a possession or occupation of lands or tenements, belonging to two or more persons, of which none can say which is his several portion, each having the whole, &c. as coparceners before partition.

PROKOPHEVA, in *Geography*, a town of Russia, in the government of Irkutsk, on the Kirenga; 40 miles S.S.E. of Kirensk.

PROLABIUM, in *Anatomy*, the red part of the lip, intervening between the common skin and the mucous membrane, and forming the very margin of the mouth.

PROLAPSUS, or PROCIDENTIA *Ani*, denotes, in *Surgery*, a very distressing complaint, in which a tumour is produced at the anus by a descent and protrusion of the rectum, or that bowel which forms the lower termination of the intestinal canal. It is not, however, the whole of this intestine which protrudes, but only a part of its internal membrane which becomes inverted and passes out at the anus, forming a red, soft, flattish, circular tumour. (Schacher de Morb. a situ Intestinar. Haller, Disput. Chirurg. Select. tom. iii. p. 14.) Levret, in passing his finger into the vagina of a patient, who had had for twenty years a bleeding, livid, fetid swelling, as large as one's fist, and occasioned by a prolapsus ani, found the vagina and uterus both in their natural situations; a circumstance which could not have been, had the whole of the rectum been concerned in the protrusion, as is commonly supposed. *Traité des Polypes*. p. 162.

A protrusion of the internal membrane of the rectum is frequently observed in children, affected with tenesmus, or dysentery, or tortured with a fit of the stone, or undergoing the operation of lithotomy. Women, having internal hemorrhoids, and in the violent efforts of labour, are also subject to the same accident. *Smellie's Midwifery*, vol. iii.

In the early and most simple stage of this disease, the swelling may be easily reduced by compressing it with the fingers, and the reduction may be maintained by the application of a bandage, which will keep up moderate pressure. The majority of patients get into the habit of assisting themselves in the preceding way. But if the disorder be chronic, if the reduction of the swelling be neglected, if the protrusion occur again from the slightest causes, or the tumour continue exposed to the effect of the external air, the protruded part acquires a larger size, its surface puts on a fungous appearance, and ulcerates and bleeds. By degrees the health is impaired; digestion is disturbed; the patient becomes languid; and the loss of blood weakens and ultimately destroys him. Such was the fate of a child eight years of age, who was afflicted for more than six months with a prolapsus ani, which could not be kept reduced. The tumour, without being absolutely painful, was incessantly bleeding, and the child died of hectic complaints. *Binninger*, obs. 62, centur. 2. p. 198.

Another child, ten years of age, but strong and robust, living in the country, had for upwards of a year a prolapsus ani, forming rather a hard swelling two or three inches in length. Lassus succeeded in reducing it by making rather forcible pressure, which the surgeons, who had previously seen the patient, had been afraid of putting in practice. The cure was complete immediately the reduction was accomplished, nor were any other steps necessary. *Pathologie Chirurgicale*, tom. ii. p. 133.

When a prolapsus ani is chronic, the internal membrane of the rectum, being exposed to the contact of the air, puts on a fungous thickened appearance, and ulcerates and bleeds. The consequence is an habitual weakness, sometimes accompanied with impossibility of reducing the tumour, or of keeping it reduced, provided it have acquired from long duration a considerable volume. In this alarming state of the complaint, the old writers recommended the cauterization of the surface of the tumour. (*Ætius*, *Tetrabibli. quart. ferm. 2. cap. 7. p. 760. Vegetius*, *Mulo medicina*, lib. iii. cap. 11.) Amongst the moderns, Lassus is also a strong advocate for such practice. It is known, says he, that the membranous lining of the rectum sometimes partly,

or totally sloughs, in consequence of gangrenous inflammations, in persons labouring under prolapsus ani and internal highly painful hemorrhoids. Many cases prove, adds this writer, that patients have been cured after such sloughing, whether brought on by the interference of the practitioner, or the salutary operation of nature, provided the inflammation has been sufficiently great to detach a part, or the whole of the internal membrane in the form of sloughs, together with some of the hemorrhoidal swellings. Cheselden, Anatomy, seventh edit. p. 158. Tulpius, cap. 17. lib. iii. Med. Essays of Edinburgh, vol. v. p. 654. Cowper, Anatomy of the Human Body, tab. 39, fig. 7. Levret, Traité des Polypes, p. 162.

With respect to the plan of cauterizing bleeding, ulcerated, inveterate, irreducible cases of prolapsus ani, it is not to be expected that it will now meet with any approbation amongst the surgeons of this country, who, being well acquainted with the mode of stopping hemorrhage by ligatures and compression, would have no fear of attempting the extirpation of such a disease with the knife.

A prolapsus ani is mostly owing to too violent and repeated exertions of the rectum itself, excited by some source of irritation about the extremity of this intestine. Thus, the too frequent employment of aloetic medicines, the action of which particularly affects the large intestines, often occasions the above consequence. The same thing results from small worms, known by the name of ascarides, and which, lodging about the lower part of the rectum, occasionally cause excessive irritation. Habitual costiveness, hemorrhoids; in a word, every thing which, by stimulating the rectum, excites too violent an action of this intestine, may induce the complaint under consideration.

Authors of surgical works have, not uncommonly, recommended fomenting the prolapsed part with emollient and antiseptic decoctions, before making an attempt to reduce it. They even advise the operator, for the purpose of succeeding with more ease, to cover his finger with linen, smeared with wax and oil. But all such preparations are useless, and, when a surgeon is called to a patient afflicted with a prolapsus ani, the greatest service he can render, is to put back the displaced part, as quickly as possible, into its natural situation, without leaving the intestine exposed to the dangerous effects which may arise during the time wasted in employing fomentations, &c. Also, as much greater manual dexterity can be made use of, when the fingers are perfectly uncovered, than when they have greasy gloves on, it is best not to follow the latter method. However, if it should be judged proper to cover the hands with any thing, a piece of fine cotton will best answer the purpose.

The patient being in bed, lying upon his side, or, what is better, on the abdomen, while his buttocks are raised rather higher than the rest of the body, the surgeon is to make strong, but equal pressure, with the palm of his hand on the lower portion of the prolapsed intestine. By continuing such pressure, the intestine may, in general, be easily reduced. But if this plan should not suffice, the upper part of the protruded intestine must be compressed with the fingers of one hand, while the lower part is pressed upward by the palm of the other one. In this way we are almost sure to succeed. It is true, that if, in consequence of having too long delayed the reduction, or from some other cause, the gut has become much swollen and inflamed, it will be impossible to reduce the part before such symptoms have been subdued. For this purpose it may be proper to take some blood from the patient, in such quantity as his strength will allow. The intestine may also be fomented

with a warm solution of the acetate of lead, (*saccharum saturni*.) When the swelling has been diminished by these means, there will be no difficulty in replacing the parts, by pursuing the plan already explained.

The greatest difficulty is not the returning of the intestine, but keeping it in its place. The latter object often gives a great deal of trouble. For, after the bowel has frequently descended, the sphincter sometimes becomes so weakened, that it can no longer keep the part supported. Hence, the complaint not only recurs whenever the patient goes to stool, but even whenever he walks, or places himself in an erect posture, of which there are many examples.

Different bandages have been devised for supporting the anus after its reduction. But it is not an easy matter to invent one, which is in every respect adapted to what such an inconvenience requires. A compress, doubled several times, is usually applied to the anus, and supported in this position by means of a T bandage. In many cases, this method of keeping up the intestine answers very well. A machine was invented by Mr. Gooch, which has the double advantage of supporting the intestine more securely than any other with which we are acquainted, and of allowing the patient to take a great deal more exercise than he could do without its assistance. See Gooch's Surgery.

Elastic gum pessaries were invented a few years ago by M. Bernard, an ingenious artist, who employed this substance for making various articles used by surgeons. The instrument which we have just mentioned, consists of an oblong oval body, rounded at one end, and terminating at the other in a narrow, rather long neck, with a flat border at its extremity. The body of this instrument, when introduced into the intestine beyond the sphincter, dilates and supports the gut, while the sphincter embraces its neck, and the border of this part of the instrument hinders it from ascending too far up the rectum. A string is also attached to the edge, which tends to prevent the occurrence. This pessary is very smooth, and, consequently, cannot do any injury to the parts. It is also very light, being only composed of a very thin, though tolerably solid, substance. As it is pierced at its termination, it does not impede the discharge of air, which might otherwise incommode the patient.

When the intestine is protruded at the time the patient is at stool, the part is to be immediately replaced. This the patient should accustom himself to do without assistance, and then the bandage, or pessary, is to be applied. In order to strengthen the sphincter ani and adjacent parts, the weakness of which must, in the majority of cases, be regarded as the entire cause of the disease, the patient should take preparations of bark and steel, make use of the cold bath, and frequently have cold water dashed against his buttocks and loins. Astringent injections, particularly such as are composed of an infusion of gall-nuts, or oak-bark, are also very serviceable. A small quantity of alum, or sugar of lead, has sometimes been added to these injections; but, in general, all additions of saline substances are to be deemed improper, because salts usually produce an irritation of the intestine.

A much more serious disorder has been confounded with the prolapsus ani; *viz.* one, in which a considerable portion of the colon, cæcum, and even sometimes of the ilium, becomes everted and pushed out at the anus. Former practitioners considered this occurrence in the same point of view as the disease of which we have just been treating. In this case, they believed that the whole of the rectum became everted, in consequence of the relaxation of the sphincter and levatores ani, and that it then drew after it other por-

tions of the intestinal canal. But they ought to have been undeceived by the strangulation, which sometimes occurs under such circumstances, and which not only throws a great obstacle in the way of the reduction of the displaced part, but even sometimes brings on mortification. Besides, the connections of the rectum with the neighbouring parts, by means of the cellular substance which surrounds it, and the attachment of this intestine to the posterior surface of the urinary bladder, render the above origin of the complaint impossible. Such an explanation could only be admitted with regard to those protrusions of the rectum which come on in a very slow manner. This account could not afford a satisfactory explanation of certain cases, in which the everted intestine presents a very enormous tumour. Fabricius ab Aquapendente mentions his having seen tumours occasioned by a prolapsus of the rectum, which were as long as the fore-arm, and as large as the fist. In the "Mélanges des Curieux de la Nature," we find an account of a tumour of this sort, which was two feet long, and occurred in a woman from parturition. Nor is a more satisfactory reason assigned for these cases, by supposing that they originate from a relaxation of the villous coat of the rectum, and its separation from the muscular one. We are not authorized to imagine that such a separation can take place to a considerable extent, nor so suddenly, as to give rise to the phenomena sometimes remarked in this disease.

But more accurate observations have removed all doubt upon this subject. In the fourth volume of the "Mémoires de l'Académie de Chirurgie," we read an account of a pretended prolapsus of the rectum, which, after death, was discovered to be an eversion of the cæcum, the greater part of the colon being found at the lower end of this intestine, and most of the rectum at its upper part. This eversion began at the distance of more than eleven inches from the anus, and terminated about five or six from this opening, the tumour, formed by the disease, having been reduced some time before the child's death. It was impossible to draw back the everted part, in consequence of the adhesions which it had contracted. Another distinction has evinced the same fact. A child, after suffering very acute pain in the abdomen, after receiving a blow, had a prolapsus of the intestine through the anus, about six or seven inches long. This was taken for a prolapsus of the rectum. After death, the termination of the bowel out of the anus was found to be nothing less than the cæcum, which had passed through the colon and rectum, to make a protrusion at the anus. See INTUSSUSCEPTIO.

PROLAPSUS of the Iris. See IRIS.

PROLAPSUS Oculi. See EXOPHTHALMIA.

PROLAPSUS Uteri. This distressing complaint presents itself in two different degrees; in one the uterus descends more or less into the vagina; in the other it protrudes entirely out of this passage, and hangs down between the patient's thighs. A prolapsus uteri may happen, either out of the time of pregnancy, during this period, or at the moment of parturition. Women, who are not pregnant, but who have a large pelvis, are in the habit of carrying or lifting heavy weights, and have already had several children, are particularly subject to the present disorder. It may readily be distinguished by an inspection of the parts. The body of the uterus fills the cavity of the vagina, at the orifice of which the os tinæ may be felt. The patient feels in her groins and about the pelvis dragging pains, which are exasperated by walking, but subside entirely when she keeps her bed, and the uterus has been pushed back with the finger, and kept there with the assistance of a pessary.

If this first degree of the disorder be not obviated, the uterus protrudes altogether from the vagina, and presents itself externally, which may happen either by degrees, or all on a sudden. The uterus, when thus protruded, forms a red oblong tumour, larger above than below, and terminating in the transverse opening of this viscus. The patient can neither walk nor sit down; she experiences pain in the groins and lumbar region; and has difficulty of voiding her urine and feces. The vagina becomes inverted, and one part of the fundus of the bladder being drawn slowly outward, covers the anterior and superior part of the tumour to which it is adherent. A prolapsus uteri of this description degenerates into a chronic disease, which may continue for several years, if not rectified on its first occurrence. (Saviard, obs. 10, &c. p. 49. Ruysch, Observat. Anat. Chirurg. i. 7. et 9. Mem. de l'Acad. de Chirurgie, tom. iii. p. 361.) When it has existed a long while, its reduction can only be effected gradually, by the patient being confined to a horizontal position in bed, by low diet, and by daily covering the swelling, which is hard, thick, and almost insensible, with linen wet with an emollient decoction. As soon as the size of the uterus is a little diminished, an attempt is to be made to replace it by pushing it from below upwards, which operation may be facilitated by raising the pelvis, and taking care to have the bladder and rectum empty. Should the reduction be accomplished, the uterus is to be maintained in its natural situation with a pessary.

When the uterus protrudes completely from the vagina at the period of delivery, and at the moment when the woman makes the most violent efforts, no attempt should be immediately made to reduce the part, a thing that would also be impracticable. It would only be fatiguing the mother and child with useless trials. On the contrary, we ought to support the uterus, gradually dilate its orifice, bring the labour to a conclusion, and carefully extract the placenta. When delivery has taken place, the womb contracts, its size is lessened, and the reduction can then be easily effected. Fabricius, de Fœtus vivi extractione, utero prolapsu. Vide Haller, Disputat. Chirurg. selectæ, tom. iii. p. 431.

About the fourth or fifth month of pregnancy, and sometimes rather later, the uterus, by means of its weight, becomes displaced; and in women who have a large pelvis, and have already had several children, protrudes more or less out of the vagina. The patients experience a sense of heaviness about the rectum, dragging pains in the groins and lower part of the back, and weakness and prostration of strength. At length they are attacked with constipation and retention of urine, which complaints increase as the prolapsus uteri increases. Speedy relief is here essentially required, and the proper mode of procuring it, is by making the patient keep her bed, where she must endeavour to void her urine, and the uterus is to be pushed back with the finger, in order to avoid a recurrence of the retention of urine, which is occasioned by the pressure of the womb on the neck of the bladder.

A woman, twenty-six years of age, and four months with child, slipped and fell down while carrying a heavy burden on her shoulders. At the instant she felt a violent pain in the loins and region of the pubes, accompanied with an absolute inability to void her urine. An ignorant practitioner being called to assist her, prescribed diuretic medicines, instead of introducing a catheter and drawing off the urine. For twelve days the patient suffered inexpressible pain, without being able to discharge a drop of fluid from the bladder, and she at last fell a victim to the ignorance of her

her medical attendant. After death the uterus was found in a state of prolapsus in the vagina, and its cervix protruding at the vulva. The bladder was so considerably distended, that it was two feet long, and one broad, and contained twenty pints of water. "Patet adeoque luculentissimé," says the writer of this case, "quam sinistra illi medici, ad multorum hominum detrimentum, praxim suam excerceant, qui chirurgiam negligent." Kulm, Dissert. de Uteri Lapsu, Gedani 1732, in 4to. Vide Disput. Chirurg. selectæ, Haller, tom. iii. p. 587.

Girls are seldom afflicted with a prolapsus uteri. The disease, however, may take place slowly in them, in consequence of violent exertions.

There is an example on record of a young girl becoming pregnant, and being delivered of a child, notwithstanding she had a prolapsus uteri, which had existed a long while. When she was fourteen, and had her menses upon her, she made a considerable exertion to throw a bundle of herbs over a wall. She felt at the moment a very acute pain in the loins and lower part of the abdomen. The next day the uterus had descended into the vagina, and protruded at the vulva. This young woman lived six years with the complaint, which gradually became worse. At the age of twenty-two she married, but for the space of twenty years never conceived. At length the act of generation was consummated, and the period of pregnancy passed over without any material indisposition. At the time of parturition a very considerable portion of the uterus protruded at the vulva, in form and size resembling a large melon. It was hard and elastic, and seemed as if it had become adherent to the labia, so closely did they embrace it. As the cervix uteri did not dilate, it became necessary to divide it at two opposite points, in order to make the requisite room for the extraction of the child, which was dead. Delivery was followed by no serious consequences: the lochia were discharged in abundance. An attempt was made to reduce, gradually, the uterus which had been so long displaced, by keeping the patient in bed, and using emollient fomentations and the vapour bath. She only pursued this treatment, however, one week, and then resumed her ordinary work. The uterus continued in the same state as it was before pregnancy, with this exception, that its displaced part became rather longer and more cylindrical. This woman, at the age of fifty-three, ten years after her delivery, still enjoyed good health, and followed her usual country-work. *Traité des Maladies de la Vessie*, par M. Chopart, tom. ii. p. 73.

It is generally admitted, that a prolapsus uteri is exceedingly difficult to reduce and keep up in patients who are fat; while, in thin women, the reduction and support of the displaced part can be managed with much less trouble.

For the preceding short and accurate account of the prolapsus uteri, we are indebted to M. Lassus. See *Pathologie Chirurgicale*, tom. ii.

PROLAPSUS of the *Vagina*. See **VAGINA**.

PROLATE, in *Geometry*, an epithet applied to a spheroid produced by the revolution of a semi-ellipsis about its longer diameter.

If the solid be formed by the revolution of a semi-ellipsis about its shorter diameter, it is called an *oblate spheroid*; of which figure is the earth we inhabit, and, perhaps, all the planets too; having their equatorial diameter longer than the polar. See **SPHEROID**.

PROLATIO *Major et Minor*. Prolation, in the beginning of figurative counterpoint, was the manner of regulating the value of notes by signs at the beginning of a movement, which determined whether long notes were to be

regarded as perfect or imperfect, that is, whether ternary or binary, equal to three notes of the next degree, or 2. Points which answer that purpose now were not then in use. The ternary notes in triple time were called *perfect*, as we have often observed elsewhere, and the binary, or common time, *imperfect*. See **MODAL Signs**, or **MOODS**, as they were called.

In the MS. of Waltham Holy Cross, there is a tract entitled "Regulæ Magistri Thomæ Walsingham; de Figuris compositis et non compositis, et de Cantu perfecto et imperfecto, et de Modis." And this comprehensive little tract does not promise more than the author has performed; as the simple and compound figures or notes, their perfect and imperfect powers, the moods and every thing that concerned the time and measure of such music as then subsisted, is very well explained; particularly the moods and signs of prolation, which we do not recollect to have seen represented in any other authors equally ancient. His chapters on rests or pauses, on the signs of perfection and imperfection in the notes, and of the alteration of their value, by position or colour, are very instructive.

The signs of prolation at first were confined to four; two for perfect or triple time, and two for imperfect or common time. The circle with a point of perfection in the centre, thus \odot , was the sign for the great mode perfect, in which all long notes were equal in duration to *three* of the next shorter in degree. The simple circle, unaccompanied by the point, was used for notes of a shorter duration, but with the same triple power. These two moods may be compared with our present measures of $\frac{3}{4}$ and $\frac{3}{8}$, where each note is occasionally rendered perfect, or equal to three others, by a point, instead of the general augmentation implied by the circle, which the old masters placed at the beginning of a movement.

The signs of imperfect, or, as we now call it, common time, were these \odot , \odot , which differ but little from those in present use for dupla proportion, or an equal number of notes in a measure; where each longer note is only equal to *two* of the next shorter kind. This seems to us even clearer than Morley's account "of the prolation of the more, and the prolation of the less—the prick of perfection, &c." which his old English darkens instead of illustrating.

PROLECTATIO, a word used in chemistry to express an extraction of the finer substances of a mixed body by the attenuation of the subtler particles; so that these, being rarefied, separate spontaneously from the rest, and leave the grosser and less valuable part in form of a residuum behind.

PROLEGOMENA, formed of $\pi\rho\omicron\lambda\omicron\gamma\mu\epsilon\tau\alpha$, *I preface*, or *speak before*, in *Philology*, certain preparatory observations, or discourses prefixed to a book, &c. containing something necessary for the reader to be apprized of, to enable him the better to understand the book, to enter deeper into a science, &c.

The generality of arts and sciences require some previous instructions, some prolegomena.

PROLEPSIS, $\pi\rho\omicron\lambda\omicron\gamma\mu\epsilon\tau\alpha$, or anticipation, a figure in *Rhetoric*, by which we anticipate, or prevent what might be objected by the adversary.

It serves likewise to conciliate the audience, while the speaker appears desirous to represent matters fairly, and not to conceal any objection which may be made against him.

Thus, *It may perhaps be objected, &c. You will ask, &c. But some man will say, How are the dead raised, or with what body do they come? Thou fool, that which thou sowest, &c.* Where the objection is turned into an argument against the adversary, as in the last instance, it is called *antistrophe*, or *inversio*.

inverso. Where it is rejected as insufferably absurd, it is called *apodioxis*.

PROLEPTIC, *προληπτικός*, denotes a periodical disease, which anticipates, or whose paroxysm returns sooner and sooner every time; as is frequently the case in agues, &c.

PROLES, Lat. in English progeny, are such issue as proceed from a lawful marriage; though if the word be used at large, it may denote others.

PROLIFER, in *Botany*, a word sometimes used in specific names, or in definitions, to express either a greater assemblage of flowers, in one common integument, than is usual in the genus; witness *Dianthus prolifer*; or, more frequently, a preternatural luxuriance of growth in the herbage or inflorescence of any plant.

PROLIFIC, in *Medicine*, something that has the qualities necessary for generating. See **FECUNDITY**.

PROLIXITY, in *Discourse*, the fault of entering into too minute a detail; of being too long, precise, and circumstantial, to a degree of tediousness.

Prolixity is the vice opposite to conciseness and laconism.

Prolixity is a fault commonly charged on Guicciardini, Gassendus, &c. See **METHOD**.

PROLOCUTOR of the *Convocation*, the speaker or chairman of that assembly.

The archbishop of Canterbury is, by his office, president or chairman of the upper house of convocation. The prolocutor of the lower is an officer chosen by the members the first day of their meeting, and is to be approved of by the higher.

It is by the prolocutor their affairs, debates, &c. are to be directed; and their resolutions, messages, &c. delivered to the higher house; by him all things propounded to the house are read, suffrages are collected, &c. See **CONVOCA-TION**.

PROLOGIA, *Προλογία*, in *Antiquity*, a festival celebrated by the inhabitants of Laconia, before they gathered their fruits. The Romans also celebrated a feast of the same kind.

PROLOGUE, **PROLOGUS**, in *Dramatic Poetry*, a discourse addressed to the audience before the drama or play begins.

The word is formed from *προλογος*; *proloquium*, *fore-speech*, formed of *προς*, and *λογος*; *fermo*.

The original intention of the prologue was to advertise the audience of the subject of the piece, and to prepare them to enter more easily into the action; and sometimes to make an apology for the poet.

The prologue is of a much more ancient standing than the epilogue. The French have left off the use of prologues, except in their operas; those few they now and then make having nothing in them of the genuine prologue, as bearing no relation to the subject, but being mere flourishes or harangues in praise of the king, &c.

In the ancient theatre, the *prologus* was properly the actor who rehearsed the prologue; the prologue was esteemed one of the dramatis personæ, and never appeared in the piece in any other character; so that the learned are surprised to find Mercury, in Plautus's *Amphitryo*, speaking the prologue, and yet acting a considerable part in the play afterwards.

The prologue, therefore, among them, was a part of the piece; indeed, not an essential, but an accessory part. With us the prologue is no part at all; but something entirely distinct and separate: with them the drama was opened with the appearance of the prologue; with us it is not opened till after the prologue is retired; with us, therefore, the curtain is kept close till after the prologue; with them it must have been withdrawn before.

Hence proceeds a still more considerable difference in the practice of the prologue; for with us the prologue speaks in his real or personal character; with them, the prologue spoke in his dramatic character.

With us, he always directs his speech to the audience, considered as in a play-house; to pit, box, and gallery; with them, he ought, in propriety, to have spoken as to a chorus of by-standers, or persons to be present at the real action; but this being in good measure inconsistent with the design of the prologue, their persons spoke in the dramatic capacity to the audience in its principal capacity; which was an irregularity that either the good fortune, or the good sense, of the moderns have freed them from. They had three kinds of prologues; the first, *ὑποθετικόν*, in which the poet delivered the argument of the piece; the second, *συγγλυτικόν*, in which the poet recommended himself, or his piece, to the people; the third, *αποφορικόν*, in which objections were obviated, &c.

PROLONGED FACE. See **FACE**.

PROLUSION, **PROLUSIO**, in *Literature*, a term applied to certain pieces, or compositions, made previously to others, by way of prelude or exercise.

Diomedes calls the *Culex* of Virgil, and his other opuscula, prolusions; because written before the great ones. The prolusions of Strada are very ingenious pieces. The famous M. Huet, bishop of Avranches, had all Strada's prolusions by heart.

PROMACHIA, *Προμαχία*, in *Antiquity*, a festival in which the Lacedæmonians crowned themselves with reeds.

PROMALACTERION, the name of the first apartment in the hot baths of the ancients; this was a hot and close room, in which the person was kept a while before he plunged at once into the warm water.

PROMB, in *Geography*, a town of Austria; nine miles W. of Tauffkirchen.

PROME, or **PRONE**, or *Peenye-mew*, a city of the Birman empire, and capital of a district, situated on the Irrawaddy; containing, as it has been said, above 30,000 inhabitants. Their number, as Col. Symes was informed, was greater than that of Rangoon, and their market was better supplied. This city is renowned in Birman history, as having been the scene of many long sieges and bloody conflicts. It has no remarkable buildings; some of its streets are of considerable length, and they are infested by a great number of dogs, and the inhabitants, men, women, and children, crowd into them to indulge their curiosity at the sight of an European, expressing their astonishment by loud laughs, and clapping of hands, but intending no contempt or offence; respect and kindness to strangers being inculcated by parents, as well as sanctioned by the practice of the Birmans. At the upper end of the present city are the ruins of the ancient port of Prome, which had been a small pentagon, constructed of brick, and, from its situation, very strong. The modern fort is nothing more than a palisaded inclosure, with earth thrown up behind it. Low hills on the eastern side approach the town, in which the rains have formed channels down to the river, that are crossed by wooden bridges. The town has several yards for the accommodation of stone-cutters, who are employed in manufacturing flags for pavements, and slabs and vases for the use of temples, out of a fine free-stone which is found in its vicinity. Adjacent to the town there is a royal menagerie of elephants, consisting of two rows of lofty well-built stables, in which these animals are lodged during the rains. The city of Prome, and the province in which it stands, are the jaghire, or estate, of the second son of the king, who derives his title from them. Prome is sometimes called

'Terreckettaree, or single skin; and the Birmanians have an old legendary tale concerning the origin of this name; it is related, that a favourite female slave of Tutebong-mangoe, or the mighty sovereign with three eyes, importuned her lord for the gift of some ground; and being asked of what extent, replied in similar terms with the crafty and amorous Elifa, when she projected the site of ancient Carthage. Her request was granted, and she used the same artifice. The resemblance of the stories is curious. Col. Symes was informed, that the ruins of a large fort and city, much surpassing the present, stood about a league eastward of the town. Prome is 165 miles N.N.W. of Rangoon. N. lat. 19°. E. long. 95°. Symes's Ava, vol. ii.

PROMETHEIA, Πρωθεΐα, in *Antiquity*, an Athenian solemnity celebrated in honour of Prometheus, with torch races, in remembrance that he was the first that taught men the use of fire.

PROMETHEUS, in the *Ancient Astronomy*, was the name of a constellation of the northern hemisphere, now called Hercules, or Engonasis.

PROMETHEUS, in *Mythology*, the son of Japetus, one of the Titans, and Clymene according to Hesiod, or of Themisa according to Eschylus, whom the poets feign to have formed men of clay, and animated them by fire stole from heaven; at which Jupiter being angry sent Mercury to chain him to mount Caucasus, and to set a vulture to his liver, which grew again as fast as it was devoured.

This fable is variously related by different authors. Prometheus, as some say, being a man of subtle and crafty genius, attempted to impose upon Jupiter in a sacrifice, and thus to find out whether he was really worthy to be reckoned a god. Having for this purpose slain two oxen, he stuffed one of the skins with the flesh, and the other with the bones of the victims, the latter of which was chosen by Jupiter. The god, resolved to be revenged upon all mankind, deprived them of the use of fire; but Prometheus, with the assistance of Minerva, who had already aided him by her advice in forming the body of a man of tempered clay, got up to heaven, and approaching the chariot of the sun, stole from thence the sacred fire, which he brought down to earth in a ferula. (See Hor. Od. 3. l. 2.) Jupiter, incensed at this strange and audacious enterprise, ordered Vulcan to form a woman, endowed with all perfections, whence she was called Pandora. (See her story under PANDORA.) Jupiter failing to ensnare and delude Prometheus by this artifice, ordered Mercury to carry him to mount Caucasus, and chain him to a rock, where an eagle was eternally to prey upon his liver. This part of the history of Prometheus, and his subsequent deliverance either by Hercules or Jupiter himself, abounds with fictions, which are supposed to contain some ancient facts under this fabulous disguise. M. Bannier supposes that this is merely a continuation of the history of the Titans. Prometheus, as he conjectures, was not exempt from the persecutions which harassed the other Titans. As he returned into Scythia, which he durst not quit so long as Jupiter lived, that god is said to have bound him to Caucasus. This prince addicted to astrology, frequently retired to mount Caucasus, as to a kind of observatory, where he contemplated the stars, and was, as it were, preyed upon by continual pining, or rather by vexation, on account of the solitary and melancholy life which he led. This is supposed to have given rise to the fable of the eagle or vulture that incessantly preyed upon his liver. Herodotus, however, alleges, that Prometheus was put in prison for not being able to stop the overflowing of a river, which from its rapidity was called the eagle; or at least that he was obliged to fly with a part of his subjects to the mountains to

escape the inundation, till a traveller, represented by Hercules, undertook to dam it up by a mount, and to kill the eagle, as it may be said, by making its course regular and uniform; thus Prometheus was delivered by this hero from his prison, or retreat. The inhabitants were at this time savage and without laws; Prometheus, who was a polite and well-informed prince, taught them to lead a more rational life, instructed them in agriculture, physic, &c., and thus gave rise to the hyperbolic expressions of his having formed a man, whom Minerva, the goddess of sciences, had animated. Lactantius explains this fable by supposing that Prometheus was the first who taught the art of making statues of clay; whence he is said to have invented the art of statuary. As to his theft of fire, some authors say, that this part of the fable had its rise from his having taught man the use of fire. Diodorus Siculus says that he discovered combustible materials fit for kindling and maintaining fire. Bannier is of opinion, that the origin of this fiction was, that Jupiter, having ordered all the shops where iron was forged to be shut up, lest the Titans should make use of it against him, Prometheus, who had retired into Scythia, there established good forges; hence came the "Calybes," those excellent blacksmiths; perhaps Prometheus also, not thinking to find fire in that country, brought some thither in the stalk of the ferula, in which it may be easily preserved for several days. (See FERULA.) As for the two oxen which Prometheus is said to have slain, that he might impose upon Jupiter, this part of the fable is said to be founded upon his having been the first who opened victims with a view of drawing omens from the inspection of their entrails. According to Le Clerc, Prometheus is the same with Magog, the former being the son of Japetus, and the latter the son of Japhet and grand-son of Noah. Both Prometheus and Magog settled in Scythia; the latter invented or improved the art of founding metals, and of forging iron, which the poets attributed to Prometheus; and Diodorus too says that he invented several instruments for making fire. The appellation Magog signifies vexation, as Prometheus was gnawed by a vulture.

If we rely on the statement of sir Isaac Newton, Prometheus was nephew to the famous Sesostris, who, according to his account, lived about the time of the Argonauts, a few years before the Trojan war. As that prince had accompanied his uncle in his expedition, he was left by him upon mount Caucasus, with a part of his troops, to preserve the conquests he had made in Scythia. Admitting this to be the case, Prometheus would be an Egyptian originally, and his deliverer would be Hercules the Argonaut, the son of Alcmena. But many of the ancients, and particularly Hesiod, represent Prometheus as one of the Titans.

The learned Bryant adopts the opinion of those who consider Prometheus and Noah as the same person. Prometheus raised the first altar to the gods; he constructed the first ship, and transmitted to posterity many useful inventions. He is supposed to have lived in the time of the deluge, and to have been guardian of Egypt at that season. His influence was limited to that region; because the Egyptians, like the people of Phocis, Argos, Thessaly, and Dodona, confined the deluge to the boundaries of their own country. Hence we may plainly see the person who is alluded to under the character of Prometheus. He was the same as Osiris; the same also as Dionusius, the famous husbandman, planter of the vine, and inventor of the plough. (Bryant's Analysis of Mythology, vol. ii. 273.) Prometheus received divine honours, or at least such as were destined to the heroes: accordingly Pausanias tells us (in his Attics), that Prometheus had an altar in the academy itself, and that games were instituted

instituted to him, which consisted in running from that altar to the city with torches that were to be kept perpetually burning.

PROMIESZ, in *Geography*, a town of Lithuania; 35 miles W. of Troki.

PROMISE, in *Law*, is when, upon a valuable consideration, a man binds himself by his word, to do or perform such an act as is agreed on with another: it is in the nature of a verbal covenant, and wants nothing but the solemnity of writing and sealing to make it absolutely the same. See COVENANT and ASSUMPSIT.

PROMISE, in *Moral Philosophy*, is a kind of social transaction between two parties, in which some declaration is made, or assurance given, on the part of one to the other, which brings us under an obligation to act or not to act, from which we should otherwise have been free. What makes a promise is, that it be expressed by one party to the other with understanding, and with an intention to become bound, and that it be accepted by him, and the expression, if it is not accompanied with understanding and will to engage, never makes a promise. Such an obligation never flows merely from declaring a resolution or intention. The intention to perform the promise, or not to perform it, whether the intention be known to the other party or not, makes no part of the promise; this is a solitary act of the mind, and can neither constitute nor dissolve an obligation. A promise must mean more than a declaration of resolution or intention; and the whole difference is, that the one relates to the *present*, the other to *future* time.—When I say I *intend* to do an action, I affirm only a present fact:—but to promise is to declare that such a thing *shall* be done, or that such and such events *shall* happen. In this case, it is not enough to acquit me from the charge of falsehood, that I *intend* to do what I promise, but it must be actually done, agreeably to the assurances given. After declaring a *resolution* to do an action, a man is under no obligation actually to do it, because he did not say he would; his word and veracity are not engaged; and the non-performance cannot infer the guilt of violating truth. On the contrary, when a person declares he *will* do any action, he becomes obliged to do it, and cannot afterwards omit it, without incurring the imputation of declaring falsehood, as really as if he declared what he knew to be a false past or present fact; and in much the same manner as he would have done, if he had pretended to know, and had accordingly asserted, that a certain event would happen at a certain time which yet did not then happen. There is, however, a considerable difference between this last case, and the falsehood implied in breaking promises and engagements; for the object of these is something, the existence of which depends on ourselves, and which we have in our power to bring to pass; and therefore, here the falsehood must be known and wilful, and entirely imputable to our own neglect and guilt. But in the case of events predicted which are not subject to our dominion, the blame, as far as there may be any, must arise from pretending to knowledge which we really want, and asserting absolutely what we were not sure of.

To *promise*, then, being to assert a fact dependent on ourselves, with an intention to produce faith in it and reliance upon it, as certainly to happen; the obligation to keep a promise is the same with the obligation to regard truth; and the intention of it cannot be, in the sense some have asserted, to will or create a new obligation; unless it can be pretended that the obligation to veracity is *created* by the mere breath of men every time they speak, or make any professions. If, indeed, we mean by creating a new obligation, that the producing of a particular effect or performance of

an external action becomes fit, in consequence of some new situation of a person (or some preceding acts of his own) which was not fit before; it may be very well acknowledged; nor is there in it any thing in the least mysterious. Thus, performance becomes our duty after a promise, in the same sense that repentance becomes our duty in consequence of doing wrong, reparation of an injury in consequence of committing it, or a particular manner of conduct in consequence of placing ourselves in particular circumstances and relations of life. As a confirmation of this account, if any confirmation were necessary, it might be observed, that false declarations in general, and violations of engagements, admit of the same extenuations or aggravations according to the different degrees of solemnity with which they are made, and the different importance of the subjects of them.

The account above given of the nature and obligation of a promise, is very different from that of Mr. Hume in the third volume of his “*Treatise of Human Nature* ;” and with respect to the obligation of a promise, it is somewhat different from archdeacon Paley’s mode of reasoning in his “*Principles of Moral and Political Philosophy*,” vol. i. This ingenious writer deduces the obligation of performing promises, not from any innate moral principles, of which a sense of obligation is supposed to be one, but from the necessity of such a conduct to the well-being, or, indeed, the existence, of human society. Men act, he says, from expectation; expectation is, in most cases, determined by the assurances and engagements which we receive from others; and if no dependence can be placed upon these assurances, no judgment could be formed of many future events, nor should we know how to regulate our conduct with respect to them. Confidence, therefore, in promises, is essential to the intercourse of human life; and there could not be this confidence, if men were not obliged to perform them: the obligation, therefore, to perform promises is essential to the same end, and in the same degree. Next to the nature and obligation of promises, the next subject of inquiry is the sense in which they are to be interpreted. If the terms of a promise admit of more senses than one, it is obvious that the promise is to be performed in that sense in which the promisee received it.

Adverting to the account that has been just given of the obligation of promises, it will appear that this obligation has been thought to depend upon the expectations which we knowingly and voluntarily excite. Consequently, any action or conduct towards another, which we are sensible excites expectation in that other, is as much a promise, and creates as strict an obligation, as the most express assurances. This is the foundation of “*tacit promises*.”

A person may either simply declare his present intention, or accompany his declaration with an engagement to abide by it, which constitutes a complete promise. In the first case, the duty is satisfied, if he was *sincere* at the time of the declaration, though he may afterwards change his purpose: but in the latter case, a person has parted with the liberty of changing. Another inquiry of importance in relation to this subject, pertains to the variety of cases in which promises are not binding. Promises are not binding, where the performance is *impossible*. Here, however, the promiser is guilty of a fraud, if he be privately aware of the impossibility at the time of making the promise: and if the promiser himself occasions the impossibility, it is a direct breach of the promise. Promises are not binding, where the performance is *unlawful*. Of this there are two cases; one, where unlawfulness is known to the parties at the time when the promise is made; and the parties are not obliged to perform what the promise requires, because they

were under a prior obligation to the contrary: the guilt of such promises lies in the making, not in the breaking of them. The other case is, where the lawfulness was not known, or did not exist, at the time of making the promise; there the lawfulness becomes a condition of the promise, and when the condition fails, the obligation ceases. It appears in this connection to be a matter of importance, that no persons should ever give a promise which may interfere in the event with their duty. The reason is obvious: because, when this interference occurs, their duty must be discharged, though at the expence of their promise, and, not unusually, of their good name. The specific performance of promises is reckoned a perfect obligation; and it has been laid down by many casuists, in opposition to what is above asserted, that where a perfect and imperfect obligation clash, the former is to be preferred. Paley thinks that there is no reason for this opinion; but that of two contradictory obligations, the one which is prior in point of time ought to prevail. It is the unlawfulness of the performance, and not any unlawfulness in the subject or motive of the promise, which destroys its validity. Again, a promise does not lose its obligation, merely because it proceeded from an unlawful motive. A promise cannot be deemed unlawful, where it produces, when performed, no effect beyond what would have taken place if the promise had never been made: and this is the single case in which the obligation of a promise will justify a conduct, which, unless it had been promised, would be unjust. Moreover, promises are not binding, where they contradict a former promise; because the performance is then unlawful. Promises are not binding before acceptance, that is, before notice given to the promisee; for where the promise is beneficial, if notice be given, acceptance may be presumed. In this case the promiser has not done that which constitutes the essence of a promise: that is, he has not voluntarily excited expectation. Promises are not binding which are released by the promisee. Erroneous promises are not binding in certain cases: as, where the error proceeds from the mistake or misrepresentation of the promisee; and when the promise is understood by the promisee to proceed upon a certain supposition, or when the promiser apprehended he so understood it, and that supposition turns out to be false.

It has been long controverted among moralists, whether promises be binding which are extorted by violence or fear? The solution of this question will depend upon this circumstance, whether mankind, upon the whole, are benefited by the confidence reposed in such promises? This, on many occasions, is a doubtful point, and accordingly the obligation of such promises is doubtful. With regard to promises extorted through fear, Cicero observes (De Off. l. iii. c. 29, 30.) "If you do not pay to robbers the sum you promised as a ransom for your life, you are guilty of no dishonesty, not even though you were sworn to do it." We have the following anecdote in Ramsay's Life of Viscount Turenne, which evinces his high sense of honour. As he was coming home one night, he fell into the hands of robbers, who stopped his coach near Paris. On his promising them 100 louis d'ors to let him keep a ring of much less value, they returned it; and one of them had the boldness to go to his house the next day, and, in the midst of a large company, to whisper him, and demand the performance of his promise. The viscount ordered the money to be paid him, and before he related the adventure, he allowed the robber time to escape; adding, that a promise ought to be kept inviolable, and that an honest man should never break his word, though given to knaves. For other particulars relating to promises, we refer to Price on Morals, p. 260, &c. Grove's System

of Moral Philology, vol. ii. Paley's Principles, &c. vol. i. Reid's Essays, ess. v. See CONTRACT, COVENANT, FIDELITY, and VOW.

PROMISSORY NOTE. See NOTE, and BILL of Exchange.

By 48 Geo. III. c. 149. the stamp duties upon bills, &c. which were imposed by 44 Geo. III. c. 98. (which last act had repealed the former duties) were repealed; and by schedule, part 1, the following stamp duties are imposed; viz. upon every

Inland bill of exchange, draft, or order for the payment to the bearer, or to order, either on demand, or otherwise, of any sum of money amounting to 40s. and not exceeding 5l. 5s.		£	s.	d.
Exceeding 5l. 5s. and not exceeding 30l.	30l.	0	1	0
30l.	50l.	0	2	0
50l.	100l.	0	3	0
100l.	200l.	0	4	0
200l.	500l.	0	5	0
500l.	1,000l.	0	7	6
3,000l.	-	1	0	0

Inland bill, draft, or order, for the payment of any sum of money, though not payable to bearer or to order, if the same shall be delivered to the payee, or some person on his behalf, } The same duty as on a bill of exchange for the like sum, payable to bearer or order.

Inland bill, draft, or order, for the payment of any sum of money, weekly, monthly, or at any other stated periods, if made payable to the bearer, or to order, or if delivered to the payee, or some person on his behalf; where the total amount of the money thereby made payable shall be specified therein, or can be ascertained therefrom, } The same duty as on a bill payable to bearer or order, for a sum equal to such total amount.

And where the total amount or the money thereby made payable shall be indefinite, } The same duty as on a bill for the sum expressed only.

And the following instruments shall be deemed and taken to be inland bills, drafts, or orders, for the payment of money within the intent and meaning of this schedule, and the foregoing act, viz.

"All drafts or orders for the payment of any sum of money, by a bill or promissory note, or for the delivery of any such bill or note, in payment or satisfaction of any sum of money; where such drafts or orders shall require the payment or delivery to be made, to the bearer or to order, or shall be delivered to the payee, or to some person for his behalf.

"All receipts given by any banker, or other person, for money received, which shall entitle, or be intended to entitle, the person paying the money, or the bearer of such receipts, to receive the like sum from any third person.

"And all bills, drafts, or orders for the payment of any sum of money out of any particular fund, which may or may not be available; or upon any condition or contingency, which may or may not be performed or happen; if the same shall be made payable to the bearer or to order, or if the same shall be delivered to the payee, or to some person on his behalf."

Foreign bill of exchange, (or bill of exchange drawn in, but payable out of Great Britain,) if drawn singly, and not in a set, } The same duty as on an inland bill of the same amount and tenor.

Foreign

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Foreign bills of exchange drawn in sets, according to the custom of merchants; for every bill of each set, where the sum made payable thereby shall not exceed 100 <i>l.</i>	£	s.	d.
	0	1	0
Exceeding 100 <i>l.</i> and not exceeding 200 <i>l.</i>	0	2	0
200 <i>l.</i> - - - 500 <i>l.</i>	0	3	0
500 <i>l.</i> - - - 1,000 <i>l.</i>	0	4	0
1,000 <i>l.</i> - - - 3,000 <i>l.</i>	0	5	0
3,000 <i>l.</i> - - - -	1	0	0

Exemptions.

“ All bills of exchange and bank post bills issued by the governor and company of the bank of England.

“ All bills, orders, remittance bills, and remittance certificates, drawn by commissioned officers, masters, and surgeons in the navy, or by any commissioner or commissioners of the navy, under the authority of the 35 Geo. III. c. 94.

“ All bills drawn pursuant to any former act of parliament, by the commissioners for victualling the navy, or by the commissioners for managing the transport service, and for taking care of sick and wounded seamen, upon and payable by the treasurer of the navy.

“ All drafts or orders for the payment of any sum of money to the bearer on demand, and drawn upon any banker, or person acting as a banker, who shall reside or transact the business of a banker, within ten miles of the place where such drafts or orders shall be drawn; provided such place shall be specified in such drafts or orders: and provided the same shall bear date on or before the day on which the same shall be issued; and provided the same do not direct the payment to be made by bills or promissory note.

“ All bills, for the pay and allowances of his majesty’s land forces, or for other expenditures liable to be charged in the public regimental or district accounts, which shall be drawn according to the form now prescribed, or hereafter to be prescribed by his majesty’s orders, by the paymasters of regiments or corps, or by the chief paymaster or deputy paymaster and accountant of the army depot, or by the paymasters of recruiting districts, or by the paymasters of detachments, or by the officer or officers authorized to perform the duties of the paymastership, during a vacancy, or the absence, suspension, or incapacity of any such paymaster as aforesaid, save and except such bills as shall be drawn in favour of contractors or others who furnish bread or forage to his majesty’s troops, and who by their contracts or agreements shall be liable to pay the stamp duties on the bills given in payment for the articles supplied by them.”

By the same act of 48 Geo. III. c. 149. sched. part 1. a duty is imposed upon every

Licence to be taken out yearly by any banker or bankers, or other person or persons, who shall issue any promissory note for money payable to the bearer on demand, and allowed to be re-issued, of	£	s.	d.
	20	0	0
And also upon every promissory note for the payment, to the bearer on demand, of any sum of money not exceeding 1 <i>l.</i> 1 <i>s.</i>	0	0	4
Exceeding 1 <i>l.</i> 1 <i>s.</i> and not exceeding 2 <i>l.</i> 2 <i>s.</i>	0	0	8
2 <i>l.</i> 2 <i>s.</i> - - - 5 <i>l.</i> 5 <i>s.</i>	0	1	0
5 <i>l.</i> 5 <i>s.</i> - - - 20 <i>l.</i>	0	1	6
20 <i>l.</i> - - - 30 <i>l.</i>	0	3	0
30 <i>l.</i> - - - 50 <i>l.</i>	0	4	6
50 <i>l.</i> - - - 100 <i>l.</i>	0	7	6

Which said note not exceeding 2*l.* 2*s.* may be re-issued,

after payment thereof, as often as shall be thought fit; and the said notes for any sum exceeding 2*l.* 2*s.* and not exceeding 100*l.*, may be re-issued from time to time after payment thereof, until the expiration of three years from the date thereof, but not afterwards.

Promissory note, for the payment, in any other manner than to the bearer on demand, of any sum of money	£	s.	d.
Amounting to 40 <i>s.</i> and not exceeding 5 <i>l.</i> 5 <i>s.</i>	0	1	0
Exceeding 5 <i>l.</i> 5 <i>s.</i> - - - 30 <i>l.</i>	0	1	6
30 <i>l.</i> - - - 50 <i>l.</i>	0	2	0
50 <i>l.</i> - - - 100 <i>l.</i>	0	2	0

These notes are not to be re-issued after being once paid.

Promissory note, for the payment, either to the bearer on demand, or in any other manner than to the bearer on demand, of any sum of money	£	s.	d.
Exceeding 100 <i>l.</i> and not exceeding 200 <i>l.</i>	0	4	0
200 <i>l.</i> - - - 500 <i>l.</i>	0	5	0
500 <i>l.</i> - - - 1,000 <i>l.</i>	0	7	6
1,000 <i>l.</i> - - - 3,000 <i>l.</i>	0	10	0
3,000 <i>l.</i> - - - -	1	0	0

These notes are not to be re-issued after being once paid.

Promissory note, for the payment of any sum of money by instalments, or for the payment of several sums of money at different days and times, so that the whole of the money to be paid shall be definite and certain, -

}

The same duty as on a promissory note payable after date, for a sum equal to the whole amount of the money to be paid.

And the following instruments shall be deemed to be promissory notes within the meaning of this schedule, viz.

“ All notes promising the payment of any sum or sums of money out of any particular fund, which may or may not be available; or upon any condition or contingency, which may not be performed or happen: if the same shall be made payable to the bearer or order, and if the same shall be definite and certain, and not amount in the whole to 20*l.*

“ And all receipts for money deposited in any bank, or in the hands of any banker or bankers, which shall contain any memorandum or agreement importing that interest shall be paid for the money so deposited.

Exemptions from the Duties on Promissory Notes.

“ All notes promising the payment of any sum or sums of money out of any particular fund which may or may not be available; or upon any condition or contingency which may not be performed or happen, where the same shall not be made payable to the bearer or order; and also where the same shall be made payable to the bearer or order, if the same shall amount to 20*l.*, or be indefinite.

“ And all other instruments, bearing in any degree the form or style of promissory notes, but which in law shall be deemed special agreements, except those hereby expressly directed to be deemed promissory notes.

“ But such of the notes and instruments here exempted from the duty on promissory notes, shall nevertheless be liable to the duty which may attach thereon, as agreements or otherwise.

“ Exemption as before for the governor and company of the bank of England.”

And if any such bills or drafts for 40*s.* or upwards, by this act intended to be stamped, shall be written or printed on vellum, parchment, or paper, not duly stamped as aforesaid, or with a lower stamp than by this act directed, the full duty shall be charged upon the person who shall draw or make,

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make, and utter and negotiate the same. 31 Geo. III. c. 25. f. 6.

By 48 Geo. III. c. 149. the former duties upon promissory notes and bills of exchange are repealed, excepting arrears: And new duties are by that act imposed, and divers new regulations relating to those instruments enacted. And these new duties are by f. 3. of this act, placed under the care of the commissioners for the stamp duties.

By f. 12. if any person shall, after the expiration of one calendar month from this act, make and issue, or cause to be made and issued, any bill, draft, or order for the payment of money, to the bearer on demand, upon any banker or bankers, or any acting as such, which shall be dated on any day subsequent to the day on which it shall be issued, or which shall not truly specify the place where it shall be issued, or which shall not fall within the exemption contained in the schedule (A) annexed to 44 Geo. III. c. 98. or that annexed to this act, unless the same shall be duly stamped as a bill of exchange, according to the law in force when the same shall be issued, such person shall forfeit 100*l.*; and if any person shall knowingly take any such bill, draft, or order, in payment of, or as a security for the sum therein mentioned, he shall forfeit 20*l.*; and if any banker or bankers, or any acting as such, take any such bill, &c. in payment of, or as a security for the sum therein mentioned, he shall for such a sum forfeit 20*l.*; and if any banker or bankers, or any acting as such, upon whom any such bill, &c. shall be drawn, shall pay or cause to be paid the sum of money therein expressed, or any part thereof, knowing the same to be post-dated, or knowing that the place where it was issued is not duly specified or set forth therein, or knowing that the same does not in any other respect fall within the said exemption, then such banker, &c. shall forfeit 100*l.* for every offence, and moreover shall not be allowed the money so paid, or any part thereof, in account.

And by f. 11. the making, signing, issuing, or causing to be made, signed, or issued, or accepting or paying, or causing or permitting to be accepted or paid, any bill of exchange, draft, or order, or promissory notes for the payment of money liable to any of the duties of this act, without the same being duly stamped, render those so making, &c. liable to a penalty of 50*l.*

And where any promissory or other note payable to the bearer on demand shall not exceed 5*l.* 5*s.* and be marked with a stamp duty of 3*d.* and also where such note shall exceed 5*l.* 5*s.* and not exceed 30*l.* and be marked with a stamp duty of 6*d.* or shall exceed 30*l.* and not exceed 200*l.* and be marked with a stamp to denote the respective duties hereby imposed, shall be paid by the person who made and signed, and first issued and negotiated the same, and at the place where the same was first issued; such person may, notwithstanding such payment, from time to time, so often as there shall be occasion after every such payment thereof, but not otherwise, again issue such note in like manner as the same was first issued; and every such note which at any time shall be paid by any person other than the person making or signing the same, or at any place other than the place of issuing the same, in pursuance of any direction, nomination, or appointment, for the payment thereof, contained or expressed in or upon such note, shall be taken to be thereupon wholly discharged, vacated, and satisfied, and shall be no longer negotiable, but shall be cancelled. And if any person shall again issue any such note, or if the person named or described therein for the payment thereof shall neglect or refuse to cancel the same after payment as aforesaid, he shall forfeit 20*l.* And if any such note shall not be cancelled, but shall be again issued or negotiated, there shall be paid the

like duty which shall appear to have been charged thereon before the first issuing, or by this act charged thereon as aforesaid; which duty shall be charged on the person who shall again issue or negotiate the same. 31 Geo. III. c. 25. f. 7.

But notes payable to the bearer on demand, not exceeding 5*l.* 5*s.* and 30*l.* stamped with the respective duties of 6*d.* and 1*s.* as before directed, may be again issued and negotiated by the person making or signing the same, notwithstanding such notes have been presented to and paid by him, or by any other person in pursuance of any such direction, nomination, or appointment as aforesaid, or otherwise howsoever; and so from time to time as often as occasion may require. f. 8.

And all such notes re-issued as aforesaid, shall be the property of the person holding the same, in like manner as upon the first issuing thereof. 31 Geo. III. c. 25. f. 9. 39 Geo. III. c. 107. f. 7.

By f. 15. it is provided that the bank of England shall be exempt from these duties, upon paying as a compensation the yearly sum of 42,000*l.*, provided that the said compensation shall be reduced to 4000*l.* when they cease to issue promissory notes for less than 2*l.*

By f. 15. after the 10th of October, 1808, it shall not be lawful to issue any promissory notes payable to the bearer on demand, hereby charged with a duty, and liable to be re-issued as aforesaid, without taking out a licence yearly for that purpose, to be granted by two or more commissioners of stamps for the time being, or by some person deputed in that behalf by them or the major part of them, on payment of the duty charged thereon in the schedule hereto annexed: and a separate licence shall be taken out for every town or place where any such promissory notes shall be issued, by, or by any agent or agents for any banker or other person; except that one licence yearly shall be sufficient for all the towns or places where any such banker or other person shall have established a branch of his bank, or have employed an agent for the issuing of such promissory note, previously to this act, so that every such town or place shall be notified to the stamp-office, and be specified in the first licence to be granted in pursuance of this act, and that an affidavit of the fact shall be transmitted to the stamp-office at the time of applying for such licence; and every such licence shall specify the proper name or names, and place or places of abode of the person or persons to whom the same shall be granted, and also the name of the town or place, towns or places where, and the name of the bank, firm, or title, under which such notes are to be issued; and where any such licence shall be granted to persons in partnership, the same shall specify and set forth the names and places of abode of all the persons concerned in the partnership, whether all their names shall appear on the promissory notes to be issued by them or not; and in default thereof, such licence to be absolutely void: and every such licence which shall be granted between the 10th of October, and the 11th of November, shall be dated on the 11th of October; and if granted at any other time, on the day on which granted; and every licence to continue in force from the day of the date till the 10th of October following, both inclusive.

By f. 18. those applying for such licences shall produce and leave with the proper officer, a specimen of the promissory notes proposed to be issued, and if any one by himself or his agent shall issue any such promissory note, allowed to be re-issued as aforesaid, without a licence, or at any other town or place, or under any other firm or title, than shall be specified in his licence, he shall forfeit for each offence 100*l.*

By f. 20. where any such licence shall be granted to any

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persons in partnership, the same shall continue in force for the issuing of promissory notes under the firm or title therein specified, till the 10th of October inclusive, notwithstanding any alteration in the partnership.

If any person shall write or sign, or accept or pay, or cause the same to be done, any such bill, note, draft, or order, liable to any of the duties aforesaid, without being first duly stamped as aforesaid, he shall forfeit 20*l.* s. 10. 39 Geo. 3. c. 107.

But by 37 Geo. III. c. 136. the holder of any bill of exchange, promissory or other note, draft or order, made after the 12th of July, 1797, and liable to any stamp duty, which shall be stamped with a stamp of a different denomination than is required by the aforesaid acts, if the same be of equal or superior value, may produce the same to the commissioners or officers of stamps within the times hereafter mentioned, who shall, upon payment of the duty imposed by the above acts, and the penalty hereafter mentioned over and above the said duty, stamp the same, and give a receipt for such penalty and duty on the back thereof, which shall be valid. s. 5.

And if the same be produced to the said commissioners before payable, according to the tenure and effect thereof, it shall be stamped on payment of the duty, and the penalty of 40*s.*; but if payable before the production thereof, then the same shall not be stamped, but on payment of the duty and the penalty of 10*l.* Id. s. 6.

Provided always, that no person shall have power by virtue of this act to make any bills of exchange, promissory or other notes, drafts, or orders for the payment of money, in any other manner than they might lawfully have done before the passing thereof. 31 Geo. III. c. 25. s. 11.

The aforesaid duties to be under the management of the commissioners of the stamp duties. s. 18. 39 Geo. III. c. 107. s. 23. 41 Geo. III. U.K. c. 10. s. 4.

And all vellum, parchment, or paper, by this act liable to any stamp duty, shall be stamped before the same be written or printed upon, and shall not be stamped afterwards under any pretence whatsoever. 31 Geo. III. c. 25. s. 19.

Persons counterfeiting or forging any stamp hereby directed to be made use of, shall be guilty of felony without benefit of clergy. s. 29.

And all powers given by any former act relating to the stamp duties, shall extend to these acts. 31 Geo. III. c. 25. s. 30. 39 Geo. III. c. 107. s. 24. 41 Geo. III. U.K. c. 10. s. 9.

By 48 Geo. III. c. 149. s. 21. after the passing of this act, no promissory notes for the payment of money, made out of Great Britain, or purporting to be made out of Great Britain; or purporting to be made by or on the behalf of any person or persons resident out of Great Britain, whether the same shall be made payable in Great Britain or not, shall be negotiable, or be negotiated, or circulated, or paid in Great Britain, unless the same shall have paid such duty, and be stamped as the law requires for promissory notes of the like tenor and value made in Great Britain; and if any person shall circulate or negotiate, or offer in payment, or shall receive or take in payment any such promissory note, or shall demand or receive payment of the whole, or any part of the money mentioned in such promissory note, from or on account of the drawer thereof in Great Britain, the same not being so duly stamped; or if any person or persons in Great Britain shall pay or cause to be paid the sum of money expressed in any such note, not being so duly stamped, or any part thereof, either as drawer, or in pursuance of any nomination or appointment for that purpose therein contained, the person or persons so offending shall

forfeit for each offence 20*l.* This not to extend to promissory notes made and payable only in Ireland.

And by 43 Geo. III. c. 139. if any person within any part of the united kingdom of Great Britain and Ireland falsely make, forge, or counterfeit, or cause or procure to be falsely made, forged, or counterfeited, or knowingly aid or assist in the false making, forging, or counterfeiting, any bill of exchange, or any promissory note, undertaking, or order for the payment of money, purporting to be the bill of exchange, promissory note, undertaking or order for the payment of money, of any foreign prince, state, or country whatsoever, or of any minister or officer employed in the service of any foreign prince, &c. or of any person or company of persons resident in any foreign state or country, or of any body corporate and politic, and body in the nature of a body corporate and politic, constituted by any foreign prince or state, with intent to deceive or defraud his majesty, his heirs and successors, or any such foreign prince, state or country, or any person or company of persons whomsoever, or any body corporate and politic, or body in the nature of a body corporate and politic whatsoever, whether the same be respectively resident, carrying on business, constituted or being in any part of the united kingdom, or in any foreign state or country; and whether such bill, note, or order be in English or in any foreign language, or partly in one and partly in the other; or if any person shall, within any part of the said united kingdom, tender in payment or exchange, or otherwise utter or publish as true, any such false, forged, or counterfeited bill, note, undertaking, or order, knowing the same to be false, forged, or counterfeited, with intent to deceive or defraud his majesty, &c. or any foreign prince, state, or country, or any person, or company of persons, or any body corporate and politic, or body in the nature of a body politic and corporate as aforesaid, then every such offender shall be deemed guilty of felony, and on conviction shall be transported not exceeding fourteen years. s. 1.

No person shall, within the united kingdom, engrave, cut, etch, scrape, or by any other means make or knowingly aid in the engraving, &c. or by any other means making in or upon any plate, any bill of exchange, or any promissory note or undertaking, or order for the payment of money, purporting to be the bill, note, undertaking, or order of any foreign prince, state, or country, or of any minister or officer employed in the service of any such prince, &c. or of any person or company of persons, resident in any foreign state or country, or of any body corporate and politic, or body in the nature of a body corporate and politic, or constituted by any foreign prince or state, or any part of any such bill, note, undertaking, or order, without an authority in writing for that purpose from such foreign prince, &c. or from some person duly authorized to give such authority, or shall within any part of the said united kingdom, without such authority as aforesaid, by means of any such plate, or by any other device or means, make or print any such foreign bill, note, undertaking, or order for the payment of money, or any part thereof, or knowingly, wilfully, and without lawful excuse, (the proof thereof shall lie upon the party accused), have in their custody any such plate or device, or any impression taken from the same; and if any person shall offend in any of the cases aforesaid, he shall be deemed guilty of a misdemeanor and breach of the peace, and being thereof convicted, shall be liable for the first offence to be imprisoned for not exceeding six months, or to be fined, or to be publicly or privately whipped, or to suffer one or more of the said punishments, and for the second offence to be transported to any of his majesty's colonies for
the

the term of fourteen years: provided that nothing herein shall extend in any manner whatsoever to repeal or alter any law now in force for the prevention or punishment of the crime of forgery in any respect whatsoever, within any part of the said united kingdom. f. 2.

Any action or suit brought against any person for any thing done in pursuance hereof shall be commenced within three calendar months after the fact committed, and not afterwards, and shall be brought in the country or place where the cause of action shall arise, and not elsewhere, and the defendant in such action or suit may plead the general issue, and give this act and the special matter in evidence; and if it shall appear to be done in pursuance hereof, or if any such action or suit shall be brought after the time limited, or in any other country or place, then the jury shall find for the defendant; and if upon the trial, a verdict shall pass for the defendant, or the plaintiff become nonsuit, or discontinue, or upon demurrer judgment be given against the plaintiff, the defendant shall recover treble costs, and have the like remedy for the same as any defendant hath for costs of suit in other cases by law. f. 9.

PROMONTORY, in *Geography*, a high point of land, or rock, projecting into the sea; the extremity of which to the sea-ward is usually called a *cape*, or *head-land*.

PROMOTERS, PROMOTORES, in *Law*, those persons who, in popular and penal actions, do prosecute offenders in their name and the king's; and are entitled to part of the fines and penalties for their pains.

These, among the Romans, were called *quadruplicatores*, or *delatores*; in English also, *informers*.

Sir Thomas Smith observes, that promoters belong chiefly to the exchequer and king's bench. My lord Coke calls them *turpidum hominum genus*. 3 Inst.

PROMOTER Fiscal. See **INQUISITION**.

PROMPT PAYMENT, ready money. See **PAYMENT**.

In many cases there is a discount for prompt payment.

PROMPTER, in the *Drama*, an officer posted behind the scenes, whose business is to watch attentively the actors speaking on the stage, in order to suggest and put them forward when at a stand, to correct them when amiss, &c. in their parts.

PROMULGATED, PROMULGED, Promulgatus, something published, or proclaimed.

In this sense we say the Jewish law was promulgated by Moses: the promulgation of the new law was chiefly effected by the apostles and disciples.

PROMULGATION of Laws. See **LAW**.

PROMUTHION, in *Rhetoric*. See **FABLE**.

PRONAOS, προναος, in the *Ancient Architecture*, a porch to a church, palace, or other spacious building.

PRONATION, in *Anatomy*, that motion of the upper extremity, in which the radius is carried across the ulna, and the palm of the hand turned to the ground. See **PRONATOR** and **EXTREMITIES**.

PRONATOR, a name given to two muscles of the fore-arm.

The *pronator radii teres* (épitrochlo-radien) is situated obliquely on the anterior and upper part of the fore-arm, and extends from the internal condyle of the humerus to the middle of the outer surface of the radius. It is elongated and flattened, and larger at the humeral than at the radial end. Its anterior surface is covered, in the two-thirds next to the humerus, by the fascia of the fore-arm; in the rest of its extent by the supinator longus, the radial extensors, and the radial artery and nerve. The posterior surface covers the brachialis internus and the flexor sublimis, the median

nerve, and the ulnar artery. The outer edge of the pronator teres lies, in that half which is next to the humerus; in the brachialis internus, and is separated from the supinator longus by an interval, in which the tendon of the biceps, the humeral artery, and the median nerve are placed. The other half of this edge is concealed by the supinator longus, and the radial extensors: it is parallel to the front edge of the supinator brevis, which it covers a little. The inner edge is connected, in the upper two-thirds, to the outer margin of the flexor radialis; in the other third it is unattached. The humeral extremity is fixed to the front of the internal condyle, and strongly connected to the flexor radialis. It has also a small attachment to the coronoid process of the ulna, by a few fibres separated from the rest of the muscle by the median nerve. It passes obliquely across the fore-arm, from the ulnar to the radial side, growing smaller in its course, and is fixed to the middle of the radius by a broad and thin tendon, which turns round the front of the bone, to reach the outer edge. This tendon runs for a short time on the front of the muscle, then enters into its substance, and is continued as far as the middle. The fleshy fibres come from the condyle of the humerus, from the septa which separate the muscle from the flexor radialis and the sublimis, and from the fascia of the fore-arm. From all these points they pass to the tendon just mentioned, and inclose it.

By drawing the radius across the front of the ulna, this muscle turns the palm of the hand to the ground. If the radius is held firm by the supinators, the pronator teres will bend the elbow-joint.

The *pronator quadratus* (cubito-radien) is a square muscle, situated deeply in the anterior part of the carpal end of the fore-arm, and extending straight from the ulna to the radius. Its anterior surface is covered by the flexor profundus, the flexor longus posticus, the flexor radialis, the ulna and radial arteries. The posterior surface is fixed to the lower fourth part of the anterior surface of the radius, and to the same length of the ulna: in the interval of the bones, it lies on the interosseous ligament. Of the four edges of this muscle, the superior and inferior present nothing remarkable. The external is fixed to the lower fourth part of the edge of the radius, and the internal to the same length of the corresponding edge of the ulna.

A broad aponeurosis, arising from the edge of the ulna, covers the inner portion of the anterior surface. Fleshy fibres arise from this aponeurosis, and from the surface of the ulna, and terminate on the anterior surface of the radius: they are slightly oblique from within outwards, and from above downwards.

Its effect must be simply that of drawing the end of the radius across that of the ulna, and consequently turning the palm of the hand towards the ground.

PRONG, the blade or fork part of an implement of the fork kind, that lays hold of the soil or substance to which it is applied. The term is sometimes likewise applied to the tool itself.

PRONG-Hoe, a term used to express an implement to hoe or break the ground, near, and among the roots of plants, with. It consists of two hooked points, of six or seven inches long, which, when struck into the ground, stir and remove it the same depth as the plough; and thus answer both the ends of cutting up the weeds, and opening the land close to the rows of grain.

The ancient Romans had an instrument of this kind, which they called the *bidens*; but they were afraid of its use in their fields and gardens, and only used it in their vineyards.

PRONKCHNA, in *Geography*, a town of Russia, in the government of Upha; 36 miles E. of Buzulutsk.

PRONOMÆA, a word used by some naturalists to express what is usually called the trunk, or proboscis in insects; an instrument somewhat resembling the trunk of an elephant, which most of those small animals are provided with, for the extracting the juices of plants, &c. destined for their food.

PRONOMUS of Thebes, in *Biography*, the inventor, according to Pausanias, of a flute, upon which three different modes could be played.

PRONOUN, PRONOMEN, in *Grammar*, a part of speech used instead of a noun, or name, as its substitute or representative. Whence the denomination; from *pro*, and *nomen*; q. d. *for noun*, or *name*. Accordingly, pronouns are subject to the same modifications with substantive nouns, of number, gender, and case.

As it would have been disagreeable to have been always repeating the same name, there are words invented in all languages, called pronouns, to save the necessity thereof, and to stand in the place of names: as *I*, *thou*, *he*, &c.

As nouns are the marks or signs of things, pronouns are the signs of nouns. Father Buffier, however, shews, that pronouns are real nouns or names; and that all the difference between what the grammarians call nouns and pronouns, is, that the former are more particular, and the latter more general.

They are called pronouns, because used in the place of particular nouns; indeed, sometimes they do not fill the place of nouns entirely, but need other words to assist them, to express the object spoken of: such, *e. gr.* *arc*, *who*, *whoever*, &c. which do not express any determinate object of which a thing may be affirmed, unless accompanied with another word, especially a verb: as, *whoever labours, deserves a reward*.

These father Buffier calls *incomplete* pronouns, to distinguish them from those which express an object *completely*: as, *I*, *thou*, *he*, &c.

Pronouns have three cases; the nominative, the genitive, or possessive, like nouns; and moreover a case, which follows the verb active, or the preposition, expressing the object of an action, or of a relation, which, says bishop Lowth, may be properly enough called the objective case.

Pronouns are distinguished into three several sorts, *viz.* pronouns of the first, the second, and the third person, according as the subject of the conversation is the speaker himself, the party addressed, or some third object different from both. As this third person may be absent, or unknown, the distinction of gender here becomes unnecessary; and accordingly, in English, it has belonging to it the three genders, *he*, *she*, *it*.

The grammarians ordinarily distinguish pronouns into four classes, with regard to their different signification, formation, &c. *viz.* pronouns *personal*, *relative*, *possessive*, and *demonstrative*; to which may be added *indeterminate* pronouns.

PRONOUNS, *Personal*, are those used in lieu of names of particular persons; such are, *I*, *thou*, *he*, *we*, *ye*, *they*.

Our personal pronouns have a case, which answers to the accusative of the Latin; *I*, *me*, *he*, *him*, *who*, *they*.

PRONOUNS, *Relative*, which Buffier calls *modificative*, or *determinative*, are those placed after nouns, or other pronouns, with which they have such affinity, that without them they signify nothing: such are *qui*, *who*, *that*, &c. Frequently the noun or pronoun with which the relative is joined, is understood.

For the proper disposition of the relative pronouns, in the structure of sentences, see SENTENCE.

PRONOUNS, *Possessive*, are those which denote the enjoyment or possession of any thing, either in particular or in common: as, *mine*, *thine*, *his*, &c.

These are pure adjectives, and only differ from the rest by the relation they bear to pronouns, whence they are derived, and by some particular inflections which they have in some languages.

PRONOUNS, *Demonstrative*, those which serve to indicate or point out the subject spoken of: as, *this*, *those*, &c.

PRONOUNS, *Indefinite*, are those which express their subject indeterminately: as, *whoever*, *any*, &c. These coincide with what father Buffier calls *incomplete* pronouns.

Pronouns are likewise divided into *substantive* and *adjective*. To the first belong, *I*, *thou*, *he*; to the second, *my*, *mine*, *who*, *what*, &c.

Pronouns may also be considered in two states: the first, or foregoing state, as *I*, *we*; the second, or following one, as *me*, *us*.

Mr. Harris distinguishes pronouns, which, he says, are words invented to supply pointing or indication by the finger or hand, called *δείξαι*, into *prepositive* and *subjunctive*.

Prepositive pronouns are those which are capable of introducing or leading a sentence, without having reference to any thing previous, and are divided into three orders, called the first, the second, and the third person.

Subjunctive pronouns are those which serve to subjoin one sentence to some other which is previous, as *who*, *which*, *that*, &c. and may be distinguished from other pronouns, as they are not only substitutes, but also connectives. They include the powers of the three orders into which the prepositive are distinguished, having superadded the peculiar force of connective. Hermes, chap. 5.

PRONOUNCING, PRONUNCIATION, in *Painting*, the marking and expressing the parts of all kinds of bodies with that degree of force necessary to make them more or less distinct and conspicuous.

Thus the painters, in speaking of a piece, say, these or these parts are well pronounced; which is a metaphorical way of speaking: as when we say, that a man who talks well has a fine pronunciation.

PRONSDORP, in *Geography*, a town of the duchy of Holstein; 8 miles E. of Segeborg.

PRONSK, a town of Russia, in the government of Riazan; 28 miles S. of Riazan. N. lat. 54° 14'. E. long. 30° 50'.

PRONTIA LAPIS, a name given by the writers of the middle ages to a fossil, of which they relate several extraordinary things; but their resembling it to the head of a tortoise, and giving it the virtue of preserving people from injuries by lightning, seem to make it plain that the word is only a corrupt spelling of the *brontia* of the ancients, of which Pliny has related the same things.

This was a species of echinites, supposed to fall from the clouds in thunder-storms. See BRONTLE.

PRONUNCIATION, PRONUNCIATIO, in *Grammar*, the manner of articulating, or sounding, the words of a language, represented to the eye by writing, and orthography.

From the definition it would seem, that the pronunciation were only the image of the orthography: but as we pronounce before we write, and only write to express what we pronounce, it is more just to lay down the pronunciation as the rule and model of orthography.

Pronunciation makes much the most difficult article of a written grammar: in effect, a book only expressing itself to the eyes in a matter that wholly concerns the ears, the

PRONUNCIATION.

case seems next akin to that of teaching the blind to distinguish colours.

Hence it is, that there is no part so defective in the grammars as that of the pronunciation: for the writer has frequently no term by which to give the reader an idea of the sound he would express: for want of a proper term, therefore, he frequently substitutes a vicious or precarious one. Thus the French grammarians frequently tell us that the vowels *a, e, i, &c.* are pronounced, in French, the same as in Latin; never considering, that there is not any known and determinate pronunciation of the Latin; but each nation, now, pronounces the Roman characters in the Latin, the same as it pronounces those same characters in its own language. Thus the Latin *cacus* is pronounced by the English, *sekus*, and by the Italians, *tebekous, &c.*

Hence it appears, that the relation between sounds and characters, as well as between things and words, is purely arbitrary and national.

Indeed, Plato seems of a contrary opinion, and will have a natural relation between words and the things they express, as there is a natural relation between the signs made by mutes, and the things they would imitate: so that, according to Plato, to every separate word there must be a separate motion of the mouth relative to the action expressed by the word.

Whether or no there might be such a thing in the primitive language, we dare not undertake to say; but it is certain, such a relation would require a facility of contortions in the mouth, to which we are strangers.

To give a just and precise idea of the pronunciation of a language, it seems necessary to fix, as nearly as possible, all the several sounds employed in the pronunciation of that language: this Mr. Lodwick has done, in his attempt towards an universal alphabet, where he enumerates forty-three several simple sounds (some of them, indeed, strangers to the English language); and F. Buffier, who gives thirty-three several sounds in the French tongue, twenty-nine in the Italian, thirty in the German, twenty-two in the Spanish, and twenty-four in the English.

The French language is clogged with a difficulty in pronunciation, from which most others are free; and it consists in this, that most of their words have two different pronunciations; the one in common prose, the other in verse. In prose, *e. gr.* they omit the pronunciation of the final *s* in the plural of nouns, and of the *t* in the third person of the plural of verbs, and of several other final consonants; but in verse they pronounce all.

Thus, in *à qui bon reveiller mes muses endormies?* the final *s* of *musés* is pronounced; and in *mille et mille douceurs y semblent attaches,* the *t* of *semblent* is to be pronounced.

Add to this, that in prose they soften the sound of a great many words; pronouncing *croaire* for *croire*: but in poetry the genuine pronunciation is retained.

PRONUNCIATION is also used for the fourth and last part of rhetoric, called *delivery*, which consists in regulating and varying the voice and gesture agreeable to the matter and words; so as more effectually to persuade and touch the hearers.

The pronunciation is of such importance, that Demosthenes called it the first, the second, and the third part of eloquence. By which he seemed to intimate, that he thought the whole art of oratory did in a manner consist in it. And indeed, if he had not judged this highly necessary for an orator, he would scarcely have taken so much pains himself in correcting those natural defects under which he laboured at first, in order to acquire it. For he had both a weak voice, and likewise an impediment in his speech, so

that he could not pronounce distinctly some particular letters. The former of which defects he conquered, partly by speaking as loud as he could upon the shore, when the sea roared and was boisterous; and partly by pronouncing long periods, as he walked up hill; both which methods contributed to strengthen his voice. And he found means to render his pronunciation more clear and articulate, by the help of some little stones put under his tongue. Nor was he less careful in endeavouring to gain the habit of a becoming and decent gesture, for which purpose he used to pronounce his discourses alone before a large glass. And because he had got an ill custom of drawing up his shoulders when he spoke; to amend that, he used to place them under a sword, which hung over him with the point downward.

Quintilian defines the pronunciation, *vocis, et vultus, et corporis moderatio cum venustate*; a decent agreeable manner of managing the voice, gesture, and action of the whole body.

Cicero somewhere calls it *quidam corporis eloquentia*, a certain eloquence of the body; and in another place, *sermo corporis*, the language or speech of the body.

When we address others by words, it is certainly an intention to make some impression on those to whom we speak; and it is certain, that the tone of our voice, our looks, and gestures, interpret our ideas and emotions no less than words do; nay, the impression they make on others is frequently much stronger than any which words can make. The signification of our sentiments, made by tones and gestures, has this advantage above that made by words, that it is the language of nature. The connection is so close between certain sentiments, and the proper manner of pronouncing them, that he who does not pronounce them after that manner, can never persuade us that he believes, or feels, the sentiments themselves. His delivery may be such as to give the lie to all he asserts. When Marcus Callidius accused one of an attempt to poison him, but enforced his accusation in a languid manner, and without any warmth, or earnestness of delivery, Cicero, who pleaded for the accused person, improved this into an argument of the falsity of the charge, "An tu, M. Callidi, nisi fingeres, sic ageres?" In Shakespeare's Richard II. the duchess of York thus impeaches the sincerity of her husband:

"Pleads he in earnest?—Look upon his face,
His eyes do drop no tears; his prayers are jest;
His words come from his mouth; ours, from our breast;
He prays but faintly, and would be denied;
We pray with heart and soul."

Pronunciation is the same with what we otherwise call *action*; which see. Though if we attend to the proper signification of each of these words, the former respects the voice, and the latter the gestures and motions of the body. Some writers, particularly Mr. Henly, confound it with *elocution*, which is a very different thing. That author, when he styles himself *restorer of the ancient elocution*, means of the ancient pronunciation.

There are three things which come under the pronunciation; the *memory, voice, and gesture*. See each under its proper article.

Augustus, to avoid being baulked by his memory, and at the same time save the trouble of getting off by heart, used to harangue from a writing; as we are told by Dio and Suetonius.

In public speaking a proper attention to pronunciation or delivery is, as we have already stated, of the greatest importance; and the importance of it will farther appear, if we consider the principal objects which every public speaker has

has in view. These are, first of all, to speak so as to be fully and easily understood by all who hear him; and, secondly, to speak with grace and force, so as to please and move his audience. For the attainment of the first object, the four chief requisites are, a due degree of loudness of voice, distinctness, slowness, and propriety of pronunciation. A public speaker, who wishes to be heard by all whom he addresses, should endeavour to fill with his voice the space occupied by the assembly. For this purpose, independently of the power of voice derived from nature, much depends on the proper pitch and management of the voice. Every man, says Dr. Blair, has three pitches in his voice; the high, the middle, and the low one. The first is that which he uses in calling aloud to some person at a distance; the low is when he approaches to a whisper; and the middle is that which he employs in common conversation, and which he should generally use in public discourse. It is a great mistake to imagine, that one must take the highest pitch of his voice, in order to be well heard by a large assembly. This is confounding two things which are different; loudness, or strength of sound, with the key, or note on which we speak. A speaker may render his voice louder without altering the key; and we shall always be able to give most body, most persevering force of sound, to that pitch of voice, to which we are accustomed in conversation; whereas by setting out on our highest pitch or key, we certainly allow ourselves less compass, and are likely to strain ourselves before we have done. We shall fatigue ourselves, and speak with pain; and whenever a man speaks with pain to himself, he is always heard with pain by his audience. Give the voice, therefore, full strength and swell of sound; but always pitch it on your ordinary speaking-key. Make it a constant rule never to emit a greater quantity of voice than you can afford without pain to yourselves, and without any extraordinary effort. As long as you keep within these bounds, the other organs of speech will be at liberty to discharge their several offices with ease; and you will always have your voice under command. But whenever you transgress these bounds, you give up the reins, and have no longer any management of it. It is an useful rule too, in order to be well heard, to fix the eye on some of the most distant persons in the assembly, and to consider ourselves as speaking to them. But it should be remembered, that in public, as well as in conversation, we may give disgust and offence by speaking too loud; because the speaker has thus the appearance of one who endeavours to compel assent, by mere vehemence and force of sound.

Moreover, in order to be well heard and clearly understood, distinctness of articulation contributes more, perhaps, than mere loudness of sound. With this view, every public speaker should give every sound which he utters its due proportion, and make every syllable, and even every letter in the word which he pronounces, be heard distinctly, without straining, whispering, or suppressing any of the proper sounds.

Farther, in order to articulate distinctly, moderation is requisite with regard to the speed of pronouncing. Precipitancy of speech confounds all articulation, and all meaning: and yet the contrary extreme should be avoided; as a lifeless, drawling pronunciation, which allows the minds of the hearers to be always outrunning the speaker, must render every discourse insipid and fatiguing. Rapidity of utterance in early life, however, is pardonable, as it is likely to find its own remedy in advanced age, and to prevent that tedious, tiresome drawl, which is often the attendant of prolonged life. After all, to pronounce with a proper degree of slowness, and with full and clear articulation, is

the first thing to be studied by all who begin to speak in public, and cannot be too earnestly recommended. Such a pronunciation gives weight and dignity to a discourse. It greatly aids the voice by affording pauses and rests, and it enables the speaker to swell all his sounds both with more force, and with more music. It also assists in maintaining a due self-command; whereas a rapid and hurried manner is apt to excite that flutter of spirits, which is very injurious to right execution in the province of oratory. "Promptum fit os," says Quintilian, "non præceps, moderatum, non lentum."

After the attention now recommended to the pitch and management of the voice, to distinct articulation, and to a proper degree of slowness of speech, the public speaker should diligently study propriety of pronunciation, or the giving to every word which he utters, that sound, which the most polite usage of the language appropriates to it, in opposition to broad, vulgar, or provincial pronunciation. This is requisite, both for speaking intelligibly, and for speaking with grace or beauty. In this connection it is not improper to recommend a particular attention to the accent. To what has been already offered under the term ACCENT, we shall here add the following remarks of Dr. Blair. In the English language, he says, every word which consists of more syllables than one has one accented syllable. The accent rests sometimes on the vowel, sometimes on the consonant. Seldom, or never, is there more than one accented syllable in any English word, however long; and the genius of the language requires the voice to mark that syllable by a stronger percussion, and to pass more slightly over the rest. Having first learned the proper seats of these accents, it is an important rule to give every word just the same accent in public speaking, as in common discourse. In this respect many persons err; for, when they speak in public, and with solemnity, they pronounce the syllables in a different manner from what they do at other times. They dwell upon them, and protract them: they multiply accents upon the same word; from a mistaken notion, that it gives gravity and force to their discourse, and that it adds to the pomp of public declamation. Whereas, this is one of the greatest faults that can be committed in pronunciation, it makes what is called a theatrical, or mouthing manner, and gives an artificial affected air to speech, which detracts greatly both from its agreeableness and impression. See Blair's Lect. vol. ii. Sheridan's Lectures on Elocution. See also the articles already referred to, *viz.* ACTION, ARTICULATION, GESTURE, VOICE, and also ELOCUTION, ELOQUENCE, ORATORY, and *Public Speaking*.

The public speaker, as we have above said, has another object besides that of rendering himself intelligible, and that is giving grace and force to what he utters. For this purpose it behoves him to pay particular attention to *emphasis, pauses, tones, and gestures*. See each of these articles.

PRONUNCIATION, in *Painting*. See PRONOUNCING.

PROOF, PROBATIO, in *Arithmetic*, an operation by which the truth and justness of a calculation is examined and ascertained.

The proper proof is always by the contrary rule: thus subtraction is the proof of addition, and multiplication of division: and *vice versâ*. The proof of multiplication by 9 or by 7 is precarious.

There would need no proofs in arithmetic were it not that a man is liable to make mistakes; for all the rules and operations being built on demonstration, it is thence we are assured of their truth and certitude.

The proof, then, does not confirm the rule, but only shews us whether or no we have applied it right.

PROOF, in *Law, Logic, &c.* denotes the mediums or arguments, used to evince the truth of any thing. See **EVIDENCE**.

Proofs, in the ecclesiastical courts, are obtained by witnesses examined, whose depositions are taken down in writing by an officer of the court. These are adduced after the defendant's answer upon oath, if he denies or extenuates the charge. If afterwards the defendant has any circumstances to offer in his defence, he must also propound them in what is called his "defensive allegation," to which he is intitled in his turn to the "plaintiff's answer" upon oath, and may from thence proceed to proofs as well as his antagonist.

By the French law, a *literal proof*, or *proof in writing*, called also *dead proof*, *probatio mortua*, is preferable to a testimonial, or proof *viva voce*, by witnesses. The ordinance de Moulins excludes all proof by witnesses for loans of above 1000 livres.

The proof of crimes was anciently effected among our ancestors divers ways; *viz.* by duel or combat, fire, water, &c.

The proof by red-hot iron was very frequent; the accused, to purge himself, was here obliged to make an oath, as he touched the iron. The formula, ceremonies, prayers, &c. made on this occasion, are still extant in the notes at the end of the Capitularies of Charlemagne. See **ORDEAL**.

This custom was abrogated by the emperor Frederick; but it still obtains in Mingrelia; as we are told by Lamberti, in his relation inserted in Thevenot's voyages.

If they cannot have proof of a crime, a cross is laid at the bottom of a cauldron full of boiling water, out of which the accused is obliged to fetch it with his naked hand and arm: this done, the arm is put up in a bag tied, and sealed, and three days after opened; when, if there be no marks of the burn or scald, the accused is declared innocent.

In the kingdom of Siam, to have proof of a crime, the party is obliged to wash his hands in boiling oil, or to walk on burning coals; from either of which he must come out untouched to be reputed innocent.

Sometimes they oblige the two contending parties to plunge under water; and he who stays there longest, gains the cause; and sometimes to swallow a grain of rice, prepared and charmed by their doctors: he who is able to swallow it, is declared innocent, and carried home in triumph; and the accuser punished. This looks like an imitation of what was done among the Jews to have proof of adultery.

The proof by *combat* is likewise said to subsist among the Mingrelians. See **COMBAT**.

PROOF, in *Artillery*. See **PROVING GUNS**, **GUNPOWDER**, and **POWDER-Triers**.

PROOF, in the *Sugar Trade*, a term used by the refiners in sugar for the proper state of the dissolved sugar when it should be set to harden.

The process in the bringing of sugar to this state may be understood by performing the whole work in little in this manner: take six pounds of coarse, or unrefined sugar, dissolve it over the fire in six pints of lime-water; add to this the whites of four eggs beat up to a froth, stir the whole together; then boil the liquor to a higher consistence than a syrup, or till, when exposed to the cold, it will concrete into grains. This is what the sugar-bakers call *proof*. Pour this syrup into an earthen mould, with a hole at its bottom; stop the hole, and set the vessel in a moderately warm place.

The sugar in a few days will set and harden; then open

the hole at the bottom, and lay over the top of the sugar some tobacco-pipe clay, made into a soft pap with water. The clay must be afterwards wetted at times, and the water from among it will gradually be soaked up by the sugar, and running through it will wash away the treacle without dissolving the grained part. And thus all the treacle will by degrees be drained out of the mass, and a loaf of white sugar procured. See **SUGAR**.

PROOF *Spirits*, among *Distillers*. See **SPIRITS**.

PROOF, *Bead*. See **BEAD**.

PROP, in *Rural Economy*, a term used to signify a shore or support, set up for the purpose of sustaining any thing in its proper situation, as a wall, building, tree, or plant. They should always be sufficiently strong for the purpose intended, whatever it may be, and be so placed, that they may stand securely and without giving way. When used for trees that have been transplanted, they should likewise be so secured at the top part, as to prevent their rubbing and injuring them. It has been remarked by Dr. Darwin, that as the bark is the only living part of the tree, it is liable to receive much injury from its contusion, by the pressure of the props against it, or by the strangulation of the bandage which holds it to them. He hence concludes, that as the internal wood of a tree is not alive, he many years ago fastened one prop, by a strong nail, to each fruit tree of a small orchard which he then planted, and found the tree supported with much less apparent injury than in the usual manner by three props and adopted cordage. But as most fruit-trees are extremely apt to be affected with canker, by being injured in this way by nails or other means, it should probably be adopted with caution for them, especially as where proper care is taken in fixing the supports, the business may be effected without any danger of the trees being hurt in the usual mode.

PROPAGATION, **PROPAGATIO**, the act of multiplying the kind, or of producing the like in the way of natural generation. See **GENERATION**.

Propagation is also applied to the raising of trees or plants from buds, &c. as well as to animals.

PROPECHIO, in *Geography*, a town of Istria; six miles E. of Capo d'Istria.

PROPEMPTICON, Προπεμπτικον, in *Poetry*, a poem in which are expressed ardent wishes and solemn vows for the safety of a person going upon a journey or voyage. Such is that of Horace, lib. i. od. 3, addressed to Virgil on his setting out for Athens. It was otherwise called *apopempticon*. See **APOPEMPTIC**.

The word is derived from προπεμπω, *I send forward*, or *accompany on the way*.

PROPER, **PROPRIUM**, something naturally and essentially belonging to any being.

The school philosophers, after Porphyry, distinguish four kinds of propers, or modes of propriety, which are expressed in the following verse.

"Est medicus, bipes, canescens, risibilisque."

The first, called *proprium primo modo*, what agrees to a single species, but not to all the individuals; this they call *foli, sed non omni*. As, to be a geometrician, a physician, a divine, &c. which are things proper to man; but not to all men.

The second, *proprium secundo modo*, is what agrees to the whole species, but agrees likewise to another; which they call *omni, sed non foli*. Thus, to have two feet is proper to a man, but is likewise proper to a bird.

The third, *proprium tertio modo*, is that which agrees to a single species, but not at all times; *omni & foli, sed non semper*.

per. As to grow grey, according to Porphyry, is proper to a man, but it is to an old man.

The last and highest, *proprium quarto modo*, is that which alone agrees to one kind, to all the individuals of it, and at all times; *omni, soli, & semper*. Thus, the faculty of laughing is proper to man, of neighing to horses, &c. And it is this that Porphyry calls the *true* proper.

The first three species are only accidents of the fifth vulgar predicable, to which they directly belong.

The fourth is an universal agreeing to every individual, or subject of predication of any species in such manner as to be always found absolutely in the species alone, but not at every determinate time; thus man alone is naturally risible; not that he is always laughing, but that he has the faculty of laughing at all times.

PROPER, in respect of *words*, denotes their immediate and peculiar signification, or that directly and peculiarly attached to them.

In which sense the word stands opposed to *figurative*, and *metaphorical*.

PROPER is also used, in a *Moral Sense*, to denote something that is usually found in things; as their particular, or specific virtues, &c.

In which sense we say, magnanimity is the proper virtue of heroes.

PROPER is also used for the natural qualities necessary to succeed in a thing.

In which sense we say, people of a hot vigorous temperament are proper for the army; the cold and phlegmatic are proper for study. The Romans became less proper for war, in proportion as they grew more learned and polite.

PROPER, in *Grammar*, is also applied to nouns or names, which are distinguished into *proper* and *appellative*.

Man is the appellative, Peter the proper name.

The proper name among Christians, is that imposed at baptism. See BAPTISM, and NAME.

PROPER *Feud*. See FEUD.

PROPER *Fraction*. See FRACTION.

PROPER, in the *Civil Jurisprudence*, is used in opposition to *acquired*, for an inheritance derived by direct or collateral succession.

By the old French laws, a testator can only dispose of one-fifth of his proper effects; the paternal relations inherit the paternal *propria*, and the maternal the maternal ones: so that *propria* always turn to the line whence they proceed.

The origin of the law which fixes the difference between proper goods and acquisitions, is not known; neither the Greeks nor Romans having ever made any such distinction. Indeed it seems founded on this principle of natural equity, that men are usually desirous to preserve and attach to their family the goods which they have received from their forefathers, and transmit them to those descending from the same stock.

PROPER sometimes also stands as a reduplicative, serving to mark or design a thing more expressly and formally. In this sense we say, Jesus Christ came to redeem the world in his proper person. The king did such and such a thing of his own proper motion.

PROPER *Motion*. See MOTION.

PROPER *Objects*. See OBJECT.

PROPERNAW, in *Geography*, a town of Prussia, on the Frisch Nerung; 15 miles N.E. of Elbing.

PROPERTIUS, SEXTUS AURELIUS, in *Biography*, a Roman poet, was a native of Umbria, and flourished in the reign of Augustus, by whom, and by Mæcenas, he was favoured, and who, in his turn, makes their praises a fre-

quent theme of his verse. Little is known of the history of this poet; Ovid places him between Tibullus and himself. His father was of the equestrian order, and lost his life in Perugia, among other partisans of Antony. The confiscation of his property followed, and young Propertius came to Rome, where he obtained the patronage of the great. It is not exactly known when he died, but it has been conjectured to have happened about the year 10 B. C. He has always been ranked among the most eminent of the Latin elegiacs: four books of his elegies are remaining. He is often compared with Tibullus, but is not so natural or pathetic, and is more learned, various, and ornamented, abounding in allusions to fable and mythology. He is elegant and ingenious, but frequently obscure. His amatory pieces are addressed to a single object of passion, whom he calls Cynthia, which is the poetical name of a Roman lady named Hostia or Hostilia, and with whom his connection, if real, appears to have been of the licentious kind. The editions of the Elegies of Propertius, both separately and in conjunction with those of Tibullus, are very numerous: among the best are those of Broukhufins, 1702; Vulpius, 1755; Burmann, 1780.

PROPERTY, or PROPRIETY, *Proprietas*, that which constitutes or denominates a thing proper; or it is a particular virtue or quality, which nature has bestowed on something, exclusive of all others.

Thus colour is a property of light; extension, figure, divisibility, and impenetrability, are properties of body.

PROPERTY, or *Propriety*, in *Law*, denotes dominion, or the highest right a man can have to a thing; and such as no way depends on any other man's courtesy.

In this sense, none in our kingdom have the property of any lands or tenements, except the king, in right of his crown; all other lands being of the nature of fee, and held of the king either mediately or immediately. See FEE.

Property, or propriety, however, is used for that right in lands, tenements, &c. which common persons have; importing as much as *utile dominium*, though not *directum*; and consisting in the free use, enjoyment, and disposal of all their acquisitions, without any controul or diminution, save only by the laws of the land.

The original of private property is probably founded in nature: the earth and all things in it became the general property of all mankind, exclusive of other beings, from the immediate gift of the Creator (Gen. i. 28.); and while the earth was thinly inhabited, it is reasonable to suppose, that all was in common among them, and that every one took from the public stock, to his own use, such things as his immediate necessity required. However, this communion of goods seems to have been applicable, even in the earliest ages, only to the substance of the thing, and not extended to the use of it; for, by the law of nature and reason, he who first began to use it, acquired in it a kind of transient property, that lasted so long as he was using it, and no longer: or, the right of possession continued for the same time only that the act of possession lasted.

The first objects of property were the fruits which a man gathered, and the wild animals he caught; next to these the tents or houses which he built, the tools he made use of to catch and prepare his food; and afterwards weapons of war and offence. Many of the savage tribes of America have not even now proceeded any farther; for they are said to reap their harvest, and return the produce of their market with foreigners into the common hoard or treasury of the tribe. Stocks and herds of tame animals soon became property: Abel, the second son of Adam, was a keeper of sheep; sheep, oxen, camels, and asses, composed the wealth

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of the Jewish patriarchs, as they do still of the modern Arabs. And as the world was first peopled in the East, where water was scarce, wells were, at an early period, made property. See Gen. xxi. 25. xxvi. 18.

In process of time it became necessary to form notions of more permanent dominion; and to appropriate to individuals not the immediate use only, but the very substance of the thing to be used. The labour of cultivation and art of agriculture by degrees introduced and established the idea of a more permanent property in the soil than had been before received and adopted. And as occupancy gave the right to the temporary use of the soil, so occupancy gave likewise the original right to the permanent property in the substance of the earth itself; which excludes every one else but the owners from the use of it. On this head Grotius and Puffendorff insist, that this right of occupancy is founded upon a tacit and implied assent of all mankind, that the first occupant should become the owner: and Barbeyrac, Titius, Mr. Locke, and others maintain, that there is no such implied assent, neither is it necessary that it should be: for that the very act of occupancy alone, being a degree of bodily labour, is, from a principle of natural justice, without any consent or compact, sufficient of itself to gain a title. However, it is agreed on both sides, that occupancy is the thing by which the title was in fact originally gained; every man seizing, to his own continued use, such spots of ground as he found most agreeable to his own convenience, provided he found them unoccupied by any else.

Property, both in lands and moveables thus acquired by the first taker, remained in him, by the principles of universal law, till such time as he does some other act which shews an intention to abandon it; for then it becomes, naturally speaking, *publici juris* once more, and is liable to be again appropriated by the next occupant. But this method of one man's abandoning his property, and another's seizing the vacant possession, could not long subsist in fact. Mutual convenience introduced commercial traffic, and the reciprocal transfer of property by sale, grant, or conveyance. The most universal and effectual way of abandoning property is by the death of the occupant; in which case all property must cease, considering men as absolute individuals, and unconnected with civil society. But such a constitution would be productive of endless disturbances; the universal law of almost every nation (which is a kind of secondary law of nature) has either given the dying person a power of continuing his property by disposing of his possessions by will, or the municipal law declares who shall be the heir of the deceased, or the doctrine of escheats is adopted. Thus we see, that though the origin of property is founded in nature, the modifications under which it now exists, the method of preserving it to the present owner, and of translating it from man to man, are entirely derived from society; and are some of those civil advantages, in exchange for which every individual has resigned a part of his natural liberty.

Long after the institution of many other species of property, when a country became populous, and tillage began to be practised, land became vested in a permanent occupant. The first partition of an estate which we read of was that which took place between Abraham and Lot, and that was one of the simplest possible. In Cæsar's account of Britain, there are no traces of property in land; little of it in the history of the Jewish patriarchs; none of it found among the nations of North America; and the Scythians are said to have appropriated their cattle and horses, but to have left their land in common. Hence we may infer, that the more permanent property in land was posterior in all probability to civil government and laws, and therefore

settled by these, or according to the will of the reigning chief. When, and by what gradations, land, which alone by our laws is called "real" property, and which, in the earliest period of time, was unquestionably common, was taken out of the common, and appropriated with an exclusive right to the owner, has been a subject of dispute.

Some, as we have already stated, maintain, that the occupant was allowed by the joint consent of mankind to retain it; whilst others annex property to the labour bestowed on the land during the period of occupancy. However this be, the real foundation of our right is the "law of the land." As it was the intention of God, that the produce of the earth should be applied to the use of man, this institution could not have been fulfilled without establishing property; and, therefore, such an establishment must have been consistent with his will. The land could not have been divided into separate property, without leaving it to the law of the country to regulate that division; it is, therefore, consistent with the same will, that the law should regulate the division, and, consequently, "consistent with the will of God," or "right," that any individual should possess that share which these regulations assign him. By whatever circuitous train of reasoning, says archdeacon Paley, you attempt to derive this right, it must terminate at last in the will of God: the straightest, therefore, and shortest way of arriving at this will, is the best. But if the right of property be made to depend upon the law of the land, it seems to follow, that a man has a right to keep and take every thing, which the law will allow him to keep and take; and this, in many cases, will authorize the most flagitious chicanery. To obviate this difficulty, the following distinction is proposed. With the law, we acknowledge, resides the disposal of property; so long, therefore, as we keep within the design and intention of a law, that law will justify us, as well in *foro conscientie*, as in *foro humano*, whatever be the equity or expediency of the law itself. But when we convert to our purpose a rule or expression of law, which is intended for another purpose; then we plead, in our justification, not the intention of the law, but the words; that is, we plead a dead letter, which can signify nothing: for words *without* meaning or intention have no force or effect in justice, much less words taken *contrary* to the meaning and intention of the speaker or writer.

The institution of property is, upon the whole, beneficial; and the principal advantages accruing from it are such as follow: it increases the produce of the earth, by subjecting it to cultivation; it preserves the produce of the earth to maturity; it prevents contests; and it improves the convenience of living, by enabling mankind to distribute themselves into distinct professions, and by encouraging those arts, by which the accommodations of life are supplied. With few exceptions, therefore, it may be affirmed, that even the poorest and the worst provided, in countries where property and the consequences of property prevail, are in a better situation, with respect to food, raiment, houses, and what are called the necessaries of life, than any are in places where most things remain in common. Inequality of property, in the degree in which it exists in most countries of Europe, abstractedly considered, is an evil; but it is an evil, which flows from those rules concerning the acquisition and disposal of property, by which men are incited to industry, and by which the object of their industry is rendered secure and valuable. If there be any great inequality unconnected with this origin, it ought to be corrected.

The laws of England are, in point of honour and justice, extremely watchful in ascertaining and protecting the right of property. Upon this principle the great charter has de-

clared, that no freeman shall be disseised or divested of his freehold, or his liberties, or free customs, but by the judgment of his peers, or by the law of the land. And by a variety of ancient statutes, *viz.* 5 Edw. III. c. 9. 25 Edw. III. stat. 5. c. 4. 28 Edw. III. c. 3. it is enacted, that no man's lands or goods shall be seized into the king's hands against the great charter, and the law of the land; and that no man shall be disinherited nor put out of his franchises or freehold, unless he be duly brought to answer, and be forejudged by course of law; and if any thing be done to the contrary, it shall be redressed, and holden for none. So great is the regard of the law for private property, that it will not authorize the least violation of it; no, not even for the general good of the whole community.

The objects of dominion or property are things, as contradistinguished from persons; and things are by the law of England distributed into two kinds, *viz.* things real, and things personal. Things real are such as are permanent, fixed, and immovable, which cannot be carried out of their place, as lands, tenements, and hereditaments of all kinds; things personal are goods, money, and all other moveables, which may attend the owner's person wherever he thinks proper to go. Hence property is divided into *personal* and *real*.

Moreover, the rights of personal property may be considered as in possession or in action. Those in possession are liable to two species of injuries, *viz.* the deprivation of that possession by unjust and unlawful taking them away, or by unjust detaining them, though the original taking might be lawful; and the abuse or damage of the chattels, while the possession continues in the legal owner.

Rights of property in action are such as are founded on, and arise from contracts, which are either express or implied: the former sort includes debts, covenants, and promises; and the latter are either such as are necessarily implied by the fundamental constitution of government, to which every man is a contracting party, or such as do not arise from the express determination of any court, or the positive direction of any statute; but from natural reason, and the just construction of law.

Real property is liable to various kinds of injury, the principal of which are the following, *viz.* ouster, trespass, nuisance, waste, subtraction, and disturbance; which see respectively. Blackst. Com. books i. ii. iii.

There are three manners of right or property, *viz.* absolute, qualified, and possessory. See TITLE.

For offences or crimes against private property, see LARCENY, *Malicious MISCHIEF*, and FORGERY.

PROPERTY, *Landed, Valuation of.* See VALUATION of Land.

PROPERTY, *Literary.* See LITERARY.

PROPERTY *by Prerogative*, is that property in personal chattels, a right to which may accrue either to the crown itself, or to such as claim under the title of the crown, as by grant or by prescription; such are all tributes, taxes, and customs; all forfeitures, fines, and amercements due to the king, which accrue by virtue of his ancient prerogative, or by particular modern statutes; wreck, treasure-trove, waifs, estrays, royal fish, swans, &c. and those animals known by the denomination of game. See GAME.

PROPERTY, *Right of, jus proprietatis*, is that which is vested in a man without either possession, or even the right of possession. This is often spoken of under the name of the mere right, *jus merum*; and the estate of the owner is, in such cases, said to be totally divested, and *put to a right*. A person thus circumstanced may have the true ultimate

property of the lands in himself; but by his own negligence, the solemn act of his ancestor, or the determination of a court of justice, the presumptive evidence of that right is strongly in favour of his antagonist, who has thereby obtained the absolute right of possession.

Incumbents have not the propriety of benefices, they have only the enjoyment of them. The monks have a long time disputed whether they had the propriety of the bread they eat, or only the use.

One may give the propriety of an estate, yet reserve the usufruct; in which case, by the death of the usufructuary, the usufruct is consolidated to the propriety.

In the law of England, strictly speaking, that which is called an estate in lands and tenements is termed a property in personal chattels; the law considering the first as permanent, the other as temporary and precarious.

PROPHECY, Πρῶφῆσεια, a prediction, made by divine inspiration.

One of the strongest evidences for the truth of revealed religion, is that series of prophecies which is preserved in the Old and New Testament; and a greater service, says an excellent writer, could not be done to Christianity, than to lay together the several predictions of scripture with their completions, to shew how particular things have been foretold, and how exactly fulfilled. A work of this kind was desired by the lord Bacon (*vide de Augmentis Scientiarum, lib. ii. cap. 11.*), and he entitles it the History of Prophecy; in which he proposes, that every prophecy of the scripture be sorted with the event fulfilling the same throughout the ages of the world, both for the better confirmation of faith, and for the better illumination of the church, touching those parts of prophecies which are yet unfulfilled; allowing, nevertheless, that latitude which is agreeable and familiar unto divine prophecies, being of the nature of the author with whom a thousand years are but as one day, and therefore they are not fulfilled punctually at once, but have springing and germinant accomplishment throughout many ages, though the height or fulness of them may refer to some one age. A work of this kind has been actually executed by the learned bishop Newton in his "Dissertation on the Prophecies," in three vols. 8vo. to which we refer, as containing a detail of all the prophecies in the Old and New Testament, with an account of their accomplishment.

With regard to the credibility of prophecy, it may be observed in general, that it is not at all incredible that God should, upon special occasions, foretell future events; and, if he affords an extraordinary revelation of his will to mankind, that he should attest its divine original by this kind of evidence; an evidence which, if the prophecies point to the events, and the events correspond with the prophecies, is in the highest degree conclusive and convincing. No previous conjecture nor accidental coincidence is sufficient to counteract and invalidate this kind of evidence.

As to most of the scripture prophecies, they comprehend such a variety of particulars; they so minutely describe distant events, to be accomplished in circumstances which no human sagacity could foresee or conceive likely to occur; and they accord so exactly with the facts to which they refer, that there is no way of evading the conclusion, but by either denying the premises that such prophecies were ever delivered and recorded, against which fact and history militate, or by pretending that what we call predictions are only histories written after the events had happened, in a prophetic style and manner. But it is alleged in answer to this absurd plea, that there are all the proofs and authorities, which can be had in cases of this nature, that the prophets prophesied in one age, and that the events happened in another and subsequent

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sequent age ; and we have as much reason to believe these, as we have to believe any ancient matters of fact whatever ; and by the same rule which leads us to deny these, we may as well controvert and contradict the credibility of all ancient history ; but, besides, Christian writers undertake to prove the truth of prophecy, and consequently the truth of revelation, not by an induction of particulars long ago foretold and long ago fulfilled, the predictions of which may be supposed to have been written after the histories, but by instances of things which have confessedly many ages ago been foretold, and have in these later ages been fulfilled, or are fulfilling at this very time ; so that there is no pretence for asserting such prophecies to have been written after the events ; but it must be acknowledged that the events many ages after correspond exactly with the predictions many ages before. The evidence, therefore, which prophecy furnishes in favour of the truth of religion is a growing evidence ; and the more prophecies are fulfilled, the more testimonies there are and confirmations of the truth and certainty of divine revelation. One of the greatest difficulties in Christianity turns upon the manner of completion of the scripture prophecies. In the prophets of the Old Testament are frequent predictions of the Messiah ; which the writers of the New frequently urge to the Jews and heathens as fulfilled in Jesus Christ ; and on this principle evince the truth of his mission ; but these texts, thus urged from the Old, in the New Testament, are sometimes not to be now found in the Old ; and at other times are not urged in the New in the literal and obvious sense which they seem to bear in the Old ; whence most of the Christian commentators, divines, and critics, ancient and modern, judge them to be applied in a secondary, typical, allegorical, or mystical sense. Thus, *e. gr.* St. Matthew, (if we allow the authenticity of the two first chapters of his gospel, see MATTHEW,) after an account of the conception of the Virgin, and the birth of Jesus, says, "All this was done that it might be fulfilled which was spoken by the prophet, saying, Behold a Virgin shall be with child, and shall bring forth a son, and they shall call his name Emmanuel." But the words, as they stand in Isaiah, whence they are supposed to be taken, do, in their obvious and literal sense, relate to a young woman who was to bring forth a child in the days of Ahaz ; as appears from the context, and as is owned by Grotius, Huetius, Castalio, Curcellæus, Episcopius, Hammond, Simon, Le Clerc, Lamy, &c.

This prophecy, then, not being fulfilled in Jesus, in the primary, literal, or obvious sense of the words, is supposed, like the other prophecies cited by the apostles, to be fulfilled in a secondary, typical, or allegorical sense ; *i. e.* this prophecy, which was first literally fulfilled by the birth of the prophet's son in the time of Ahaz, was again fulfilled by the birth of Jesus, as being an event of the same kind, and intended to be signified either by the prophet, or by God, who directed the prophet's speech. Grotius observes this to be the case in most, if not all, the prophecies and citations quoted from the Old in the New Testament ; and Dodwell, with sir John Marsham, refers even the famous prophecy in Daniel, about the seventy weeks, to the time of Antiochus Epiphanes ; shewing, that the expressions taken thence by Christ, and urged by him as predicting the destruction of Jerusalem by the Romans, have only in a secondary sense a respect to that destruction.

And even that famous prophecy in the Pentateuch, "A prophet will the Lord God raise up unto thee, like unto me ; to him shall ye hearken ;" which St. Luke refers to as spoken of Jesus Christ, is by Simon, Grotius, Stillingfleet,

&c. understood to signify, in its immediate sense, a promise of a succession of prophets ; though the ultimate and principal object of the prophecy was the Messiah, who resembled Moses in a greater variety of respects than any other person ever did. The resemblance is pointed out by Eusebius (*Dem. Evang.* l. 3. c. 2.) in a number of particulars, and with enlargements and additions by Jortin. *Eccles. Hist.* vol. i.

Many have allowed that the apostles applied the prophecies which they quote from the Old Testament, in a typical sense ; but, unhappily, the rules by which they quoted them are lost. Dr. Staehope laments the loss of the Jewish traditions or rules for interpreting scripture received among the rabbins, and followed by the apostles. But this loss, Surenhusius, Hebrew professor at Amsterdam, thinks he has retrieved from the Jewish Talmud, and the ancient Jewish commentaries ; and has accordingly published to the world the rules by which the apostles quoted the Old Testament.

But the truth is, these rules are too precarious, strained, and unnatural, to gain much credit.

It is well known that several of the fathers interpreted the scripture in a mystical sense, and were fond of that method of interpretation. Origen was very famous for this, inasmuch that he is sometimes led to speak of the literal sense of scripture in a very degrading manner, and as bishop Smallbroke, in his answer to Mr. Wollston, observes, with too great contempt. But he did not absolutely deny the reality of the literal sense, though he gave the preference to the mystical. Origen sometimes pleaded for a three-fold sense of scripture, and so did Jerome. Nay, Augustin pleaded for a four-fold sense of scripture. (See Glassii *Philolog. Sacra.*) But both the last-mentioned fathers seem to have abandoned, or at least depreciated, the mystical interpretations of their youth in their riper years. (See bishop Patrick's Preface to his Paraphrase on the Psalms.) Arnobius has expressed himself very decidedly concerning the uncertainty, and small authority, of the allegorical interpretation of the pagan mythology, and his observations are no less applicable to the allegorical interpretation of scripture. Mainonides (*More Nevoch.*) gives us the opinion of the Jewish rabbies concerning allegorical interpretations of scripture, in the following words. "Our rabbies were wont to be mightily delighted with allegories, and to use them frequently ; not that they are of opinion, that the allegorical interpretation is the true sense of scripture ; but that it has somewhat enigmatical in it, that is pleasant and entertaining."

Dr. Lightfoot (*Works*, vol. i.) is of opinion, that the fathers took this method of interpreting scripture from the Jews ; and that seems to be the most common opinion of learned men among the Christians. Le Clerc, and some others, however, think that allegories arose among the Heathens. Photius assures us that Philo, the Jew, taught the mode of allegorizing scripture to the Christians. See *Phot. Cod.* 105.

Grotius, as we have already suggested, maintained that the greatest part of the prophecies of the Old Testament had a double sense, and a double accomplishment. Limborch, in his Commentary on the Acts of the Apostles, accedes to his opinion. Father Baltus, a Jesuit, in the year 1737, published his "*Défense des Prophétiques de la Religion Chrétienne*," and in this work he purposely examines and refutes the opinion of Grotius at great length ; and shews that the most ancient fathers of the church, as Justin, Martyr, Tertullian, &c. never thought of interpreting the prophecies of the Old Testament in a double sense ; but

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applied them in their literal meaning to the Messiah. Mr. Whiston, in his sermons preached at Boyle's lecture in 1707, had supported the same sentiment before Baltus. He condemns all allegorical explanation of the prophecies of the Old Testament cited in the New, as weak, enthusiastic, &c. and adds, that if a double sense of the prophecies be allowed, and there be no other method of shewing their completion than by applying them secondarily and typically to our Lord, after having been in the first and primary intention long ago fulfilled in the times of the Old Testament, we lose all the real advantages of the ancient prophecies, as proofs of Christianity.

He therefore sets up a new scheme in opposition to it; he owns that, taking the present text in the Old Testament for genuine, it is impossible to expound the apostles' citations of the prophecies of the Old Testament on any other than the allegorical foundation; and therefore, to solve the difficulty, he is forced to have recourse to a supposition contrary to the sense of all Christian writers before him, *viz.* that the text of the Old Testament has been greatly corrupted since the apostolic age by the Jews. His hypothesis is, that the apostles made their quotations out of the Old Testament rightly and truly from the Septuagint version, which, in their time, was in vulgar use, and exactly agreed with the Hebrew original; and that as they made exact quotations so they argued justly and logically from the obvious and literal sense of the said quotations, as they then stood in the Old Testament; but that, since their times, both the Hebrew and Septuagint copies of the Old Testament have been so greatly corrupted, and so many apparent disorders and dislocations introduced in them, as to occasion many remarkable differences and inconsistencies between the Old and New Testament in respect to the words and sense of those quotations.

As to the manner in which these corruptions were introduced, he says, the Jews, in the second century, greatly corrupted and altered both the Hebrew and Septuagint, especially in the prophecies cited by the apostles, to make their reasoning appear inconclusive; that, in the third century, they put into Origen's hand one of these corrupted copies of the Septuagint; which Origen mistaking for genuine, inserted in his Hexapla, and thus brought into the church a corrupted copy of the Septuagint; and that, in the end of the fourth century, the Jews put into the hands of the Christians, who, till then, had been almost universally ignorant of the Hebrew, a corrupted copy of the Hebrew Old Testament.

The disagreement, then, between the Old and New Testament, in respect to the said quotations, he contends, has no place between the genuine text of the Old Testament, (now no where existing,) but only between the present corrupted text of the Old and New Testament; and, therefore, to justify the reasonings of the apostles, he proposes to restore the text of the Old Testament, as it stood before the days of Origen, and as it stood in the days of the apostles; from which text, thus restored, he doubts not, it will evidently appear, that the apostles cited exactly, and argued justly and logically from the Old Testament. But this scheme of accomplishing prophecies labours under difficulties at least as great as the allegorical scheme. Its foundation is incredible, and its superstructure, from first to last, precarious. In effect, it is inconceivable, that the Old Testament should be so corrupted; and it may be even made appear, that the Hebrew and Septuagint disagreed in the times of the apostles: add to this, that the means by which he proposes to restore the true text will never answer that end;

nor has he himself, from all the means he is yet possessed of, been able to restore one prophetic citation, so as to make that seem literally, which before only seemed allegorically applied.

In 1710, archdeacon Claggett animadverted on this notion of Whiston, and undertook the vindication of those Christian commentators, who had explained some prophecies concerning the Messiah, as not solely relating to him, in a treatise, entitled "Truth defended, and Boldness in Error rebuked."

Upon this head it may be observed, that the double sense of prophecies, for which some have zealously contended, and which others have as strenuously opposed, ought not to be understood, as if a prophecy equally and indifferently referred to many persons or events; or as if, literally referring to a lower person, it was only figuratively and allegorically to be interpreted of the Messiah (for a passage only capable of being accommodated to him is not by any means a prediction of him); but it is to be so explained, as that it may appear the Messiah was principally intended, and the prophecy literally referred to him, though it might in part be applied to some other person; and might have been understood as referring to that inferior person alone, if farther light had not been thrown upon it, by comparing other prophecies, or by the testimony of those whom, on other accounts, we have reason to regard as authentic interpreters. Nevertheless, it must be acknowledged, that though the tracing of the Messiah in such prophecies may serve to illustrate the unity of design, which is a considerable additional proof of the truth of a revelation, yet the main stress is to be laid upon such prophecies as evidently and solely relate to the Messiah and his kingdom, rather than on those which are capable of reference to other persons or events.

The learned and judicious Dr. Clarke has given double senses of several passages in the four gospels: Matt. xx. 1, &c. Matt. xxiv. 6, &c. The celebrated Mr. Locke has quoted, in his admirable preface to his Commentary on the Epistles, a passage from the learned and judicious Mr. Selden, to shew that no text of scripture has more than one meaning, which is fixed and limited by the connection; and yet Mr. Locke has, in some few instances, contended for double senses of one and the same text. 2 Cor. iii. 6. Gal. iv. 21, &c.

There are, it is said, several persons, who would be pleased with double senses, and who would be glad to have the truth and authority of them established and confirmed. Such are all mystical divines and enthusiasts, who plead for double, or manifold senses of the holy scriptures: the Papists also contend for many senses of holy scripture, because they are thus greatly helped in the proof of a number of their peculiar tenets: the Jews are highly delighted with manifold senses of scripture: and the enemies of revelation are glad to see Christians pleading for double senses, because, as they conceive, it affords the greatest advantage to them and their cause. In this number we may reckon Mr. Collins, Mr. Woolaston, and the author of "Christianity as old as the Creation," and the author of "Christianity not founded in Argument."

Collins's "Discourse on the Grounds and Reasons of the Christian Religion" was published in 1724; and in this publication he revived the objections of Faultus, and other early writers, who had endeavoured to prove that the prophecies of the Old Testament had no direct relation to Jesus Christ. We refer to Leland's "View of the Deistical Writers," and to Fabricius's "Lux Evangelica," for an account

account of the several answers which were published to this, and to another work of the same author, entitled "The Scheme of literal Prophecy considered." Bishop Warburton also, in the sixth book of the "Divine Legation of Moses," has answered what Collins had objected against a second sense of prophecy; and in the first volume of Dr. Jortin's "Remarks on Ecclesiastical History," we have some very judicious observations, both concerning prophecy in general, and concerning a double sense of some prophecies.

Dr. Sykes, in his "Connection between Natural and Revealed Religion," has a whole chapter, to shew that the ancient prophecies contained only one sense. The author of an "Essay concerning the Unity of Sense, to shew that no Text of Scripture has more than one single Sense," prefixed to Dr. Benson's Paraphrase on St. Paul's Epistles, and contained in bishop Watson's Collection of Theological Tracts, vol. iv., has particularly examined this subject, obviated the difficulties that attend the interpretation of particular passages, evinced the advantage which his hypothesis affords him for this purpose, and answered the objections that have been urged against it.

Dr. Newton, late bishop of Bristol, at the conclusion of his "Dissertations" already mentioned, has shewn how the argument from prophecy avails in proof of the truth of divine revelation. Waving any reference to those prophecies that received their full accomplishment in ancient times, and confining the attention to those of later ages, you can have no reason to doubt of the truth of prophecy, and consequently of the truth of revelation, when you see instances of things, which could no ways depend upon human conjecture, foretold with the greatest clearness, and fulfilled hundreds of years afterwards with the greatest exactness. Nay, you see prophecies, the latest of which were delivered about 1700 years ago, and some of them above 3000 years ago, fulfilling at this very time, and cities, countries, and kingdoms, in the very same condition, and all brought about in the very same manner, and with the very same circumstances, as the prophets had foretold.

You see the descendants of Shem and Japheth ruling and enlarged in Asia and Europe, and perhaps in America, and the curse of servitude still attending the wretched descendants of Ham in Africa. You see the posterity of Ishmael multiplied exceedingly, and become a great nation in the Arabians; yet living like wild men, and shifting from place to place in the wilderness; *their hand against every man, and every man's hand against them*; and still dwelling an independent and free people, in the presence of all their brethren, and in the presence of all their enemies. You see the family of Esau totally extinct, and that of Jacob subsisting at this day; *the sceptre departed from Judah*, and the people living no where in authority, every where in subjection; the Jews still dwelling alone among the nations, while the remembrance of Amalek is utterly put out from under heaven. You see the Jews severely punished for their infidelity and disobedience to their great prophet like unto Moses; *plucked from off their own land, and removed into all the kingdoms of the earth; oppressed and spoiled evermore, and made a proverb and a by-word among all nations*. You see Ephraim so broken as to be no more a people, while the whole nation is comprehended under the name of Judah; the Jews wonderfully preserved as a distinct people, while their great conquerors are every where destroyed; their land lying desolate, and themselves cut off from being the people of God, while the Gentiles are advanced in their room. You see Nineveh so completely destroyed, that the place thereof is not, and cannot be known; Babylon made a desolation for ever, a possession for

the bittern, and pools of water; Tyre become like the top of a rock, a place for fishers to spread their nets upon; and Egypt a base kingdom, the basest of the kingdoms, and still tributary and subject to strangers. You see of the four great empires of the world the fourth and last, which was greater and more powerful than any of the former, divided in the western part thereof into ten lesser kingdoms; and among them a power *with a triple crown differs from the first, with a mouth speaking very great things, and with a look more stout than his fellows, speaking great words against the most High, and changing times and laws*. You see a power cast down the truth to the ground, and prosper and praise, and destroy the holy people, not regarding the God of his fathers, nor the desire of wives, but honouring Mahuzzim, gods-protectors or saints-protectors, and causing the priests of Mahuzzim to rule over many, and to divide the land for gain. You see the Turks stretching forth their hand over the countries, and particularly over the land of Egypt, the Libyans at their steps, and the Arabians still escaping out of their hand. You see the Jews led away captive into all nations, and Jerusalem trodden down of the Gentiles, and likely to continue so until the times of the Gentiles be fulfilled, as the Jews are by a constant miracle preserved as a distinct people, for the completion of other prophecies relating to them. You see one who opposeth and exalteth himself above all laws divine and human, sitting as God in the church of God, and showing himself that he is God, whose coming is after the working of Satan, with all power, and signs, and lying wonders, and with all deceivableness of unrighteousness. You see a great apostacy in the Christian church, which consists chiefly in the worship of demons, angels, or departed saints, and is promoted through the hypocrisy of liars, forbidding to marry, and commanding to abstain from meats. You see the seven churches of Asia lying in the same forlorn and desolate condition that the angel had signified to St. John, their candlestick removed out of its place, their churches turned into mosques, their worship into superstition. In short, you see the characters of the beast and the false prophet, and the whore of Babylon, now exemplified in every particular, and in a city that is seated upon seven mountains; so that if the bishop of Rome had sat for his picture, a greater resemblance and likeness could not have been drawn.

PROPHECIES, False, are those delivered by persons pretending extraordinary commissions from God, to raise jealousies in the people, or terrify them with impending judgments, &c. Such persons are punishable at common law as impostors. This was a capital offence by stat. 1 Edw. IV. cap. 12. which was repealed in the reign of queen Mary. By statute 5 Eliz. cap. 15. none shall publish or set forth any false prophecy, with an intent to raise sedition, on pain of 10*l.* for the first offence, and a year's imprisonment; and for the second offence to forfeit all his goods and chattels, and suffer imprisonment during life; the prosecution to be within six months. (3 Inst. 128, 129.) To prophesy when the king shall die, hath been anciently held to be treason. Roll. Rep. 88.

PROPHECYINGS, a name given to certain assemblies held by the ancient Puritans in this kingdom; where alternately, says Mr. Hume, as moved by the spirit, they displayed their zeal in prayers and exhortations, and raised their own enthusiasm, as well as that of their audience, to the highest pitch, from that social contagion, which has so mighty an influence on holy fervour, and from the mutual emulation which arose in those trials of religious eloquence. Such dangerous societies, as the historian calls them, had been suppressed by queen Elizabeth; and the ministers in the Hampton-Court conference moved king James I. for their

their revival. But the king sharply replied, "if you aim at a Scottish presbytery, it agrees as well with monarchy as God and the devil. There Jack and Tom and Will and Dick shall meet and censure me and my council. Therefore I reiterate my former speech: *Le Roi s'avisera*. Stay, I pray, for one seven years, before you demand; and then, if you find me grow purfée and fat, I may perchance hearken to you. For that government will keep me in breath, and give me work enough." Such were the political considerations, which determined the king in his choice among religious parties. Hume's Hist. of England, vol. vi. p. 14. 8vo.

PROPHET, PROPHETA, προφητης, a person inspired by God with the knowledge of future events; and commissioned to declare his will, &c. to the world.

The word is derived from the Greek προφ, and φησι, said; of φημι, I say; whence also the Latins derive their *fatus*, spoken.

Among the canonical books are those of sixteen prophets; four of which are denominated the *greater* prophets, viz. Isaiah, Jeremiah, Ezekiel, and Daniel; so called from the length or extent of their writings, which exceed those of the others; viz. Hosea, Joel, Amos, Obadiah, Jonah, Micah, Nahum, Habakkuk, Haggai, Zechariah, and Malachi; who are called the *lesser* prophets, from the shortness of their writings.

The writings of the prophets form one of the three divisions of the canon of the Old Testament; and to those already enumerated, called the books of the latter prophets, are added those of the former prophets; viz. Joshua, Judges, Samuel, and Kings.

The Jews only reckon three greater prophets; Daniel they exclude as no more to be ranked among the prophets than David; not but that both the one and the other foretold many important things, but because their manner of life differed from that of the other prophets; David being a king, and Daniel a peer.

In the Greek church, the lesser prophets are placed in order before the great ones; apparently because many of the lesser prophets are more ancient than the greater.

Among the Greeks, too, Daniel is ranked among the lesser prophets. In the forty-eighth chapter of Ecclesiasticus, Isaiah is particularly called the *great* prophet; both on account of the great things he foretold, and the magnificent manner in which he did it.

Spinosa says, the several prophets prophesied according to their respective humours: Jeremiah, *e. g.* melancholy and dejected with the miseries of life, prophesied nothing but misfortunes.

Dacier observes that among the ancients, the name poet is sometimes given to prophets; as that of prophet is, at other times, given to poets.

PROPHETS, *Sons of the*, in *Scripture History*, an appellation given to young men who were educated in the schools or colleges under a proper master, who was commonly, if not always, an inspired prophet, in the knowledge of religion and in sacred music, and thus were qualified to be public preachers, which seems to have been part of the business of the prophets on the Sabbath-days and festivals. That such colleges or schools existed even from the earliest times of the Hebrew republic, is evident from many parts of the sacred history. In these the candidates for the prophetic office, removed altogether from an intercourse with the world, devoted themselves entirely to the study and exercises of religion; and over each of them some prophet of superior authority, and more peculiarly under the divine influence, presided as the moderator and preceptor of the whole assembly. It is

probable, that God generally chose the prophets, whom he inspired, out of these schools.

Although the Sacred History affords us but little information, and that in a cursory manner, concerning their institutes and discipline; we nevertheless understand that a principal part of their occupation consisted in celebrating the praises of Almighty God in hymns and poetry, with choral chants accompanied by stringed instruments and pipes. A remarkable passage to this purpose occurs in 1 Sam. x. 5—10. Saul being nominated king, and, pursuant to the command of God, consecrated by a solemn unction, a company of the prophets, as Samuel had foretold, descending from the mount of God (that being the place in which the sacred college was situated) met him; and preceded by a variety of musical instruments, *prophesied*; upon hearing which, he himself, as if actuated by the same spirit, immediately joined them, and prophesied also. The same thing again occurred to him as related in 1 Sam. xix. 20—24. Concerning the nature of this mode of prophesying all are agreed, understanding by it the celebration of the praises of God, under the impulse of the Holy Spirit, with music and song. (See also 1 Chron. xxv. 1—3.) From these instances it sufficiently appears, that the word "Nabi" was used by the Hebrews in an ambiguous sense, and that it equally denoted a prophet, a poet, or a musician, under the influence of divine inspiration. To these we may add the prophetesses, Miriam the sister of Aaron, and Deborah, who were distinguished by that title, not only because they pronounced the oracles of Jehovah, but on account of their excellence in music and poetry; sister arts, which were united by the Hebrews, as well as by all other nations, during the first stages of society. See HERREW *Music*, and HEBREW *Poetry*.

PROPHETIC POETRY, denotes that species of poetry which is found to pervade the predictions of the prophets, as well those contained in the books properly called prophetic, as those which occasionally occur in other parts of the scripture. As to the peculiar character of the prophetic poetry, bishop Lowth observes, that this species of poetry is more ornamental, more splendid, and more florid than any other. It abounds more in imagery, at least in that species of imagery which, in the parabolic style, is of common and established acceptation, and which, by means of a settled analogy, always preserved, is transferred from certain and definite objects to express indefinite and general ideas. Of all the images proper to the parabolic style, it most frequently introduces those which are taken from natural objects and from sacred history: it abounds most in metaphors, allegories, comparisons, and even in copious and diffuse descriptions. It possesses all that genuine enthusiasm, which is the natural attendant on inspiration; it excels in the brightness of imagination and in clearness and energy of diction, and consequently rises to an uncommon pitch of sublimity; hence also it often is very happy in the expression and delineation of the passions, though more commonly employed in the exciting of them; this indeed is its immediate object, over this it presides as its peculiar province.

With respect to the order, disposition, and symmetry of a perfect poem of the prophetic kind, no certain definition will admit of general application. Naturally free, and of too ardent a spirit to be confined by rule, it is usually guided by the nature of the subject only, and the impulse of divine inspiration. There are not wanting, it is true, instances of great elegance and perfection in these particulars. Among the shorter prophecies it will be sufficient to mention those of Balaam, each of which is possessed of a certain accuracy

of arrangement and symmetry of form; they open with an elegant exordium, they proceed with a methodical continuation of the subject, and they are wound up with a full and graceful conclusion. There are many similar instances in the books of the prophets, and particularly in Isaiah, which deserve the highest commendation, and may, with propriety, be classed with the most perfect and regular specimen of poetry. The following example is selected from that most accomplished writer, and it is embellished with all the most striking ornaments of poetry. The 34th and 35th chapters of Isaiah contain a remarkable prophecy under the form of a simple, regular, perfect poem, consisting of two parts, according to the nature of the subject, which, as to its general properties, is explained with the utmost perspicuity. The first part of the prophecy contains a denunciation of extraordinary punishment, indeed nothing short of total destruction against the enemies of the church of God; and, afterwards, in consequence of this event, a full and complete restoration is promised to the church itself. For the development and illustration of the whole, we must refer to Lowth, *ubi infra*. As a specimen of a prophetic poem complete in all its parts this learned author has selected one of the prophecies of Balaam, of which he says that the whole scope of the Hebrew poetry contains nothing more exquisite or perfect. This abounds in gay and splendid imagery copied immediately from the tablet of nature, and is chiefly conspicuous for the glowing elegance of the style, and the form and diversity of the figures. Numb. xxiv. 5—9. Lowth's Lectures on the Sacred Poetry of the Hebrews, translated by Dr. Gregory, pt. iii. See *HEBREW Poetry*.

For the peculiar character of each of the prophets, see their respective names.

PROPHETICAL Types. See *TYPE*.

PROPHYLACTICE, *προφυλακτική*, that part of the art of medicine which directs the preventing or preserving from diseases.

PROPTIATION, in *Theology*, is, as some have defined and represented it, a sacrifice offered to God to assuage his wrath, and render him propitious.

Among the Jews there were both ordinary and public sacrifices; asholocausts, &c. offered by way of thanksgiving; and extraordinary ones offered by particular persons guilty of any crime, by way of propitiation.

If it were a crime of ignorance, they offered a lamb, or a kid; if done wittingly, they offered a sheep: for the poor, a pair of turtles was enjoined as a propitiation.

The Romish church believe the mass to be a sacrifice of propitiation, for the living and the dead. The reformed churches allow of no propitiation, but that one offered by Jesus Christ on the cross.

There has been a considerable difference of opinion among divines concerning the meaning of the term propitiation; more especially as it is used in the New Testament, with a particular reference to the sufferings and death of Christ: but whatever efficacy some have ascribed to them as the means of obtaining pardon for the penitent and establishing their title to eternal life, it has been generally supposed, that they have been verbal declarations or memorials, that God is propitious, and not the cause of a merciful disposition in God or the means of rendering him propitious, who was before implacable. In this respect, those who maintain that sacrifices in general, and that of our Saviour in particular, which they consider as a sacrifice, were a proper expiation, or a real propitiation, affirm they neither were nor could be proper expiations. On this subject many unfounded, not to say unwarrantable, expressions have been used by controversial writers. Accordingly some have

taken occasion, from the redemption that is in Christ, to represent the blessed God as being in himself implacable, and that his inclination or disposition to shew mercy was owing merely to Christ's interposing on our behalf. In Scripture, the love of God and his compassion to sinners are represented as the very spring of this constitution, and the whole scheme of our redemption, whatever may be our ideas of its nature, efficacy, and extent, is attributed to the contrivance of the Father. Thus our Lord himself represents it: "God so loved the world, that he sent his only begotten son, that whosoever believeth in him should not perish, but have everlasting life;" and to the same purpose are the subsequent declarations of the apostles in all their writings. But if God himself was originally disposed to shew mercy, it may be asked, how is then the death of Christ a propitiation? Just in the same manner, say these divines, as a propitiation is accounted for under the Mosaic constitution. There God first orders a mercy-feat (*ἱλαστήριον*, the term used for propitiation in Rom. iii. 25.); then he requires that application be made to him as residing there, by sacrifice and by mediation of an high priest. Thus also, God resolves to shew mercy to sinners, determining at the same time that his only begotten son (not without his own consent) shall suffer death, the penalty which the original law hath denounced against transgressors; merely to demonstrate his regard to the righteous sanction of the law, and his displeasure against sin. Hence it has been said, Christ by dying for accomplishing the purpose of divine mercy, and in consequence of the appointment and will of the father and fountain of mercy, may, with the utmost propriety and strictness, be regarded and described as a "propitiation for our sins:" inasmuch as by his suffering death he hath prevented or warded off those effects and consequences of sin which would otherwise have befallen the sinner. In this scheme, as the advocates of it say, we see mercy, pure, unsolicited, unconstrained, unpurchased mercy to sinners; but God appoints that the mercy and favour, and particularly the grant of eternal life, which he designs for sinners of a particular description and character, shall be conveyed to them or conferred upon them in this way, *viz.* that Christ shall die as a sacrifice, and not as a priest, for them. This being stipulated, and Christ having complied with it, his death and his mediation, originating in the benevolence of the Deity and accepted by him, are justly represented as the means of procuring for qualified recipients the blessings which the Gospel promises. For different views of this subject, see the article *ATONEMENT*. See also *SACRIFICE* and *SATISFACTION*.

PROPTIATION also gives the name to a solemn feast among the Jews, celebrated on the tenth of the month Tisri, which is their seventh month, and answers to our September.

It was instituted to preserve the memory of the pardon proclaimed to their forefathers by Moses on the part of God; who thereby remitted the punishment due for their worship of the golden calf.

PROPTIATORY, among the Jews, was the cover or lid of the ark of the covenant; which was lined both within and without with plates of gold; inasmuch that there was no wood to be seen.

Some even take it to have been one piece of massive gold.

The cherubims spread their wings over the propitiatory. This propitiatory is said by some divines to be a type or figure of Christ, whom St. Paul calls the propitiatory ordained from all ages. See *ARK of the Covenant*.

PROPLASM, *PROPLASMA*, *προπλάσμα*, is sometimes used

used for a mould in which any metal or soft matter, which will afterwards grow hard, is cast.

PROPLASTICE, *προπλαστικη*, the art of making moulds for casting things in.

PROPOLIS, *προπολις*, a thick, yellow, odorous substance, smelling like storax, nearly akin to wax, but more tenacious; with which the bees stop up the holes and cranies of their hives, to keep out the cold air, &c.

These wary animals not only stop up in this manner all the cracks they can find, but even examine all the weak places of the hive, and will eat away a rotten or too weak part, and make up the deficiency with this propolis. Hence it derives its name from *προπολις*, *before the city*.

This was elegantly seen in the case of some of M. Reaumur's glass hives, which were framed of wood, and had squares of glass in their proper places: these squares of glass were fastened in with slips of pasted paper. The bees finding this a much weaker part of the hive than any other, and capable of being eaten through by their enemies, soon gnawed to pieces all the paper and paste, and covered those parts with the propolis in the place of that matter.

It might seem that the bees might use wax on this occasion; but this would be no defence against those of their enemies, which devour and feed on wax; and nature has guarded them against these, by supplying them with a matter which spreads more easily, is of a greater tenacity, and fixes itself much more strongly in the small crevices than wax could do. It has been known from the earliest times, that the bees made use of this substance. Pliny mentions it, and tells us, that the authors of his time distinguished three kinds of it; the first they called *metys*, the second *pissoceron*, and the third *propolis*. The last of these names is only retained among the later writers, and seems to have stood with the ancients for the pure substance, the other kinds differing from it only as they were more or less mixed with wax.

The propolis itself is a substance perfectly different from wax; it is found to be soluble in spirit of wine, or in oil of turpentine; and is soft and very extensible when laid on by the bees, but grows hard afterwards; it may, however, even in its hardest state, be softened by heat, even by that of the fingers, so as to acquire the ductility of wax; but more rosy and tenacious. Like wax it may be kneaded between the teeth, without any perceptible taste. In the mass it is blackish, but semitransparent when in thin plates. By all these observations it appears very plainly, that propolis is a true genuine vegetable resin, of the nature of many others which we have in common use. The authors who have treated of this substance, have described it very differently; George Pictorius, who has written of bees, says that it is of a yellow colour, and an agreeable smell, like that of storax, and that it would spread when warmed properly. Pliny and the old authors describe it as being of a rank and strong smell, and being used as a succedaneum for galbanum, and at present we usually find it of an aromatic and agreeable smell, resembling that of melilot, and balsam of Peru, or of the Banana poplar, insomuch that some rank it among the perfumes. The apothecaries, in some places, keep it as a medicine in their shops; but it is to be observed, that it is very various in its nature; for, according to the description of authors, it is sometimes sweet and sometimes stinking. The truth is, that the bees, who collect it as a thing to be used for a cement, not for food, are not over-curious what plants they gather it from; and hence in different hives it is found of very different colours and consistencies. In general, the propolis is of a brownish-

red colour on the surface; the red sometimes predominating, sometimes the brown; but when broken it is yellowish, or approaching to the colour of wax. It very readily dissolves in spirit of wine or oil of turpentine; and this solution is of a fine gold colour, and will serve extremely well as a varnish to colour silvered picture-frames, or other the like work, into the appearance of gold. It gives a fine gold-like appearance, indeed, to any white metal of a polished surface; all that it wants is a little more brilliancy, which is easily given it by mixing a small quantity of mastich, or of sandarach, in the solution.

It is the general opinion of those who have studied bees, that the willow and the poplar are the trees which principally furnish them with this resin, which, when it has passed through their management, we call propolis. It is very certain, however, that these are not the only trees which afford it, since the bees are not found to want this necessary material for their work, in places where there are no trees of that kind in the neighbourhood of the hives.

Mr. Thorley declares, as he tells us likewise upon the fullest evidence, that the combs, both in their foundation and superstructure, are framed of nothing but pure wax. Besides the uses of the propolis already mentioned, there is another very singular one, which must by no means be passed over in silence; this is the embalming and preserving, by means of it, certain bodies which they know not how to dispose of otherwise. Notwithstanding the care that the bees take to guard the entrance of their hives, enemies of one kind or other will often get in: these usually fare very ill; for the bee's sting is a weapon very capable of punishing such an intrusion, and the swarm is so numerous, that it is not easy for the intruder to escape repeated wounds. When a creature of small size has thus entered, and thus been killed for it, the bees with great care and pains carry him out; for they will bear no sort of foulness in the hive. It sometimes happens, however, that an unlucky snail, particularly of the large naked kind, crawls into the hive; in this case he never ceases crawling over the combs so long as he lives. It is no wonder that such cleanly creatures as the bees are highly enraged at this nasty visitor; they soon surround and kill him with their stings; but then as he is a load too heavy to allow a possibility of their carrying him out, they prevent the mischief attending the stinking of the carcase, by covering it over with a thick coat of this propolis, which perfectly well preserves it from putrefaction.

The common garden snail, with the shell, sometimes also visits these industrious and cleanly animals; and this creature they secure in a different manner, and that at the expence only of a very small quantity of the propolis: but Reaumur had an opportunity of observing the method of destroying this enemy in a very accurate and easy manner, in one of his glass hives. The snail had entered the hive early in the morning, and after crawling about for some time, had fixed itself to one of the glass squares by the same glutinous matter, by means of which it is frequently found fixed to old walls and trees; when the bees found their enemy thus fixed, they surrounded him, and in a few minutes formed a border of propolis round the verge of the mouth of the shell: to this they continually added more and more, till they had formed so thick a coat round it, that the snail could never move from the place again.

The snail is easily able to loosen the fastening which it gives itself to any place, because this is done by means of a gum, which water will dissolve; therefore the first shower of rain, or the moisture which the animal is able

to secrete from its own body, releases it in this case ; but the fastening which the bees use to fix the shell to the glass being a resin, this remains untouched by water, and must keep the animal fixed in its place till death, and even long afterwards. Reaumur's Hist. Inf. vol. x. p. 77, &c.

Mr. Thorley observes, that he has frequently seen snails, within the boxes and at the back-window, moving about, changing their situation, and continuing at times for several days together, but not so much as a single bee assaulting the offensive animal, or offering the least resistance, but, on the contrary, shunning or flying from him. He adds, that he has often observed snails coming out of the colonies, in no respect hurt or wounded, but in full health and vigour. Thorley's Enquiry, &c. p. 136.

It seems probable, that the bees are not over-curious in the choice of the matter of the propolis ; but that many vegetable resins indifferently serve for this purpose : it has been tried, however, whether they would use common turpentine, and some other of the resins in use among us by laying them before their hives ; but without success. This is an experiment, however, that requires frequent repetition ; since there are many seasons at which the bee has no occasion for this matter.

The propolis is by some esteemed sovereign in diseases of the nerves. It is also used to make holes in abscesses ; and being heated on the fire, its vapour is received for inveterate coughs.

M. Vauquelin has analysed this substance. For this purpose 100 grammes of it were digested, for twenty-four hours, in very pure alcohol. The liquor acquired a deep red tint ; and was thus filtered. Fresh spirit of wine was put to the residue, and left to digest again in the cold during twenty-four hours. As it had gained but little colour, a third quantity of alcohol was added to the marc, then boiled for a few minutes : and filtered quite hot. Six portions of alcohol were successively added to the marc and boiled : finally, to deprive it of the fat matters it retained from fragments of bees, as well as some vegetable substances and grains of sand, boiling sulphuric ether was poured on it, and the mass was pressed through a fine strainer. The residue dried, weighed 14 grammes.

To obtain the substance which had been dissolved by the alcohol, the whole quantity that had been employed in the different washings was collected, and passed through a fine strainer, which stopped all the matter precipitated by the cold. This residue was wrapped in unsized paper and pressed ; when dried and melted, it weighed 14 grammes.

All the alcohol was then distilled and reduced to three-fourths of its quantity. The liquor which came over had an aromatic odour ; but it did not render water turbid, nor was it acid. What remained in the retort was of a deeper colour. Its precipitate by water was ropy, like the resins which are obtained by the same means. By diluting this liquor with water and boiling it, a resiniform mass was obtained, on cooling, of a red-brown colour, semi-transparent, and very brittle, which weighed 57 grammes. The water in which this matter had been dissolved, contained an acid.

This resinous mass, or pure propolis, melts readily on the fire : it yields by distillation a volatile oil, white and of a very agreeable smell. The fixed part then acquires a deeper colour and becomes harder : it is soluble in fixed and volatile oils. It is a true resin, very similar to balsam of Peru, of which it contains the acid.

The 14 grammes of precipitate produced by cooling, were true wax, possessing all its properties. It remains to be known whether this wax is actually mixed with the pro-

polis by the bees ; or whether, in collecting the latter with too little care, the wax is not united to the resin.

	Grammes.
Pure wax	14
Pure resin of propolis	57
Residuum of extraneous bodies	14
Loss ; acid ; aroma	15
	100

PROPOMA, a name given by the ancients to a potion prepared of honey and wine boiled together : the proportions were four parts of wine to one of honey.

PROPORTION, PROPORATIO, in *Arithmetic*, the identity or similitude of two ratios.

Hence quantities that have the same ratio between them, are said to be proportional ; *e. gr.* if A be to B, as C to D ; or 8 be to 4, as 30 to 15 ; A, B, C, D, and 8, 4, 30, and 15, are said to be in proportion, or are simply called proportionals.

Proportion is frequently confounded with ratio ; yet the two have, in reality, very different ideas, which ought by all means to be distinguished.

Ratio is properly, that relation or habitude of two things, which determines the quantity of one from the quantity of another, without the intervention of any third ; thus we say, the ratio of 5 and 10 is 2 ; the ratio of 12 and 24 is 2.

Proportion is the sameness or likeness of two such relations ; thus the relations between 5 and 10, and 12 and 24, being the same, or equal, the four terms are said to be in proportion. Hence ratio exists between two numbers ; but proportion requires at least three.

Proportion, in fine, is the habitude or relation of two ratios, when compared together ; as ratio is of two quantities. See RATIO.

Proportion again is frequently confounded with progression. In effect, the two often coincide : the difference between them only consists in this, that progression is a particular species of proportion ; in which the second of the three terms is a mean proportional between the other two, or has the same ratio to the third, which the first has to the second.

Add to this, that proportion is confined to three terms, but progression goes on to infinity (so that progression is a series or continuation of proportions) ; and that in four terms, 3, 6, 12, 24, proportion is only between the two couples 3 and 6, and 12 and 24 ; but the progression is between all the four terms. See PROGRESSION.

Proportion, as Dr. Clarke has shewn in his correspondence with Leibnitz (see his "Works," vol. iv. p. 681, fol. 1), is sometimes confounded with quantity. Proportions, he says, are not quantities, but the proportions of quantities. If they were quantities, they would be the quantities of quantities, which is absurd. Also, if they were quantities, they would (like all other quantities) increase always by addition : but the addition of the proportion of 1 to 1, to the proportion of 1 to 1, makes still no more than the proportion of 1 to 1 ; and the addition of the proportion of $\frac{1}{2}$ to 1, to the proportion of 1 to 1, does not make the proportion of $1\frac{1}{2}$ to 1, but the proportion only of $\frac{1}{2}$ to 1. That which mathematicians sometimes inaccurately call the quantity of proportion is (accurately and strictly speaking) only the quantity of the relative or comparative magnitude of one thing with regard to another ; and proportion is not the comparative magnitude itself, but the comparison or relation of the magnitude to another. The proportion of 6

to 1, with regard to that of 3 to 1, is not a double quantity of proportion, but the proportion of a double quantity, and in general, what they call "bearing a greater or less proportion, is not bearing a greater or less quantity of proportion or relation," but "bearing the proportion or relation of a greater or less quantity to another:" it is not a greater or less quantity of comparison, but the comparison of a greater or less quantity. Thus, also, the logarithmic expression of a proportion is not (as Leibnitz styles it) a measure, but only an artificial index or sign of proportion: it is not the expressing of a quantity of proportion, but barely a denoting of the number of times that any proportion is repeated or complicated. The logarithm of the proportion of equality is 0; and yet it is as real and as much a proportion, as any other: and when the logarithm is negative, as $\bar{1}$, yet the proportion of which it is the sign or index, is itself affirmative. Duplicate or triplicate proportion does not denote a double or triple quantity of proportion, but the number of times that the proportion is repeated. The tripling of any magnitude or quantity *once* produces a magnitude or quantity, which to the former bears the proportion of 3 to 1. The tripling it a *second* time produces (not a double quantity of proportion, but) a magnitude or quantity, which to the former bears the proportion (called *duplicate*) of 9 to 1. The tripling it a *third* time produces (not a triple quantity of proportion, but) a magnitude or quantity, which to the former bears the proportion (called *triplicate*) of 27 to 1, &c.

Proportion is said to be *continual*, when the consequent of the first ratio is the same with the antecedent of the second; as, if 3 be to 6, as 6 to 12.

The proportion is said to be *discrete*, or interrupted, when the consequent of the first ratio differs from the antecedent of the second; as, if 3 be to 6, as 4 to 8.

Proportion, again, is either said to be *arithmetical*, or *geometrical*; as the ratios are.

PROPORTION, *Arithmetical*, is the equality of two or more arithmetical ratios, or the equality of difference between three or more separate quantities.

Thus, 1, 2, 3, and 2, 5, 8, 11, 14, are in arithmetical proportion; because there is the same difference betwixt the numbers compared, which are 1 to 2, and 2 to 3; or 2 to 5, and 5 to 8, &c.

If every term have the same ratio to the next, as the first has to the second, the terms are said to be in continual arithmetical proportion; as 5, 7, 9, 11, 13, 15.

If the ratio between any two terms differs from that of any others, the terms are said to be in arithmetical proportion discrete, or interrupted; as where 2 : 5 :: 6 : 9, the ratios of 5 and 6 being different from that of 2 and 5.

A series of more than four terms in arithmetical proportion, forms an arithmetical *progression*; which see.

1. If three numbers be in arithmetical proportion, the sum of the extremes is equal to double the middle term: thus, in 3, 7, 11, the sum of 3 and 11 is equal to twice 7, *viz.* 14.

Hence we have a rule for finding a mean arithmetical proportional between two given numbers; half the sum of the two being the mean required: thus, half the sum of 11 and 3, *viz.* 14, is 7.

2. If four numbers be in arithmetical proportion, the sum of the extremes is equal to the sum of the middle terms: thus, in 2 : 3 :: 4 : 5, the sum of 5 and 2 is equal to the sum of 3 and 4, *viz.* 7.

Hence, four terms in arithmetical proportion are still proportional, if taken inversely, 5 : 4 :: 3 : 2; or alternately,

thus, 2 : 4 :: 3 : 5; or inversely and alternately, thus 5 : 3 :: 4 : 2.

3. If two numbers in arithmetical proportion be added to other two, the less to the less, &c. their difference is in a duplicate ratio, *i. e.* double that of the respective parts added: thus, if to 3 : 5 be added 7 : 9, the sums are 10 : 14; whose difference 4, is double the difference of 3 : 5, or 7 : 9. And if to this sum you add other two, the difference of the last sum will be triple the sum of the first two, and so on.

If two arithmetical proportionals be subtracted from two others in the same ratio, the less from the less, &c. the arithmetical ratio of the remainder is 0. Thus, from 9 : 7 taking 5 : 3, the remainders are 4, 4.

Hence, if arithmetical proportionals be multiplied by the same number, the difference of their products will contain the first difference as oft as the multiplier contains unity: thus, 3 : 5, multiplied by 4, produce 12, 20, whose difference 8 is equal to 4 times 2, the difference of 3 and 5.

4. If two numbers in arithmetical proportion be added to, or multiplied by other two in another ratio of the same kind, less by less, &c. the sums are in a ratio which is the sum of the ratios added or multiplied: thus 2 : 4 and 3 : 9 being added, the sums are 5 : 13, whose difference is 8, the sum of 2 and 6, the difference of the numbers given.

PROPORTION, *Geometrical*, is the equality of two geometrical ratios, or comparisons of two couples of quantities.

Thus 4 : 8 :: 12 : 24, are in geometrical proportion; the ratio of 4 and 8 being equal to that of 12 and 24; *i. e.* 4 is contained as often in 8 as 12 is in 24. Again, 9, 3, 1, are in geometrical proportion, 9 being triple of 3, as 3 is of 1.

If, in a series of terms, there be the same ratio between every two terms, that there is between the first and second, they are said to be continual geometrical proportionals; as 1 : 2 :: 4 : 8.

If any two terms have a different ratio from that of the first and second, they are said to be in a disjunct, or interrupted geometrical proportion; as are 2 : 4 :: 3 : 6; where 2 is to 4, as 3 to 6; but not so as 4 to 3.

A series of progression of more than four geometrical proportionals is called a geometrical *progression*; which see.

1. If three quantities be in continual geometrical proportion, the product of the two extremes is equal to the square of the middle term: thus, in 6 : 12 :: 12 : 24, the product of 6 and 24 is equal to the square of 12, *viz.* 144. Hence we have a rule,

2. To find a mean geometrical proportional between two numbers, *e. gr.* 8 and 72.

Multiply one of the numbers by the other, and from the product 576, extract the square root 24; this will be the mean required.

3. To find a fourth proportional to three given numbers, *e. gr.* 3, 12, 5; or a third proportional to two given numbers.

Multiply the second 12 into the third 5, in the first case; and in the latter multiply the second into itself; divide the product by the first 3, the quotient 20 is the fourth proportional sought in the one, or the third in the other.

The solution of this problem is what we popularly call the *rule of proportion*, or the *golden rule*, or *rule of three*.

4. If four numbers be in geometrical proportion, the product of the extremes is equal to the product of the two middle terms: thus, in 2 : 5 :: 4 : 10, the product of 10 and 2 is equal to that of 5 and 4; *viz.* 20. Hence,

5. If four numbers represented by $a : b :: c : d$, be either

in arithmetical or geometrical proportion; they will also be in the same, if taken inversely, *viz.* $d:c::b:a$; or alternately, as $a:c::b:d$; or alternately and inversely, as $d:b::c:a$.

6. If the two terms of a geometrical ratio be added to, or subtracted from other two in the same ratio, the less to or from the less, &c. the sums or differences are in the same ratio: thus in $6:3::10:5$, where the common ratio is 2, 6, added to 10, makes 16, as 3 to 5 makes 8; and $16:8$ is in the same ratio as $6:3$, or $10:5$. Again, if 16 be to 8 as 6 to 3, their differences 10 and 5 are in the same ratio.

The reverse of which proposition is likewise true; *viz.* if to or from any two numbers be added or subtracted other two, if their sums or differences be in the same geometrical ratio as the first two, the numbers added or subtracted are in the same ratio. Hence,

7. If the antecedents, or the consequents, of two equal geometrical ratios, $3:6$, and $12:24$, be divided by the same 3; in the former case, the quotients 1 and 4 will have the same ratios to the consequents, *viz.* $1:6::4:24$; and in the latter, the antecedents will have the same ratio to the quotients, *viz.* $3:1::12:4$.

8. If the antecedents or consequents of similar ratios, $2:6$, and $3:9$, be multiplied by the same quantity 6; in the former case, the facta 12 and 18 have the same ratio to the consequents, *viz.* $12:6::18:9$; and in the latter, the antecedents have the same ratio to the products, *viz.* $2:36::3:54$.

9. If in a geometrical proportion $3:6::12:24$, the antecedents be multiplied or divided by the same number 2, and the consequents be multiplied or divided by the same number 3; in the former case, the facta, in the latter, the quotients, will be the same proportion, *viz.* $6:18::24:72$, and $1:3::4:12$.

10. If in a proportion $4:2::10:5$, the antecedent of the first ratio be to its consequent, as the antecedent of the second to its consequent; then by composition, as the sum of the antecedent and consequent of the first ratio is to the antecedent or consequent of the first, so is the sum of the antecedent and consequent of the second to the antecedent or consequent of the second; *viz.* $6:2::15:5$, or $6:4::15:10$.

11. If in a proportion $6:4::15:10$, as the antecedent of the first ratio is to its consequent, so is the antecedent of the other to its consequent; then, by division, as the difference of the terms of the first ratio is to its antecedent or consequent, so is the difference of the terms of the second ratio to its antecedent or consequent, *viz.* $2:4::5:10$, or $2:6::5:15$.

12. If in a proportion $4:2::6:3$, as the antecedent of the first ratio is to its consequent, so is the antecedent of the second to its consequent; and as the consequent of the first ratio is to another number 8, so is the consequent of the second to another number 12; *viz.* $2:8::3:12$; then will the antecedent of the first be to 8, as the antecedent of the second to 12, *viz.* $4:8::6:12$.

13. If in a proportion $8:4::12:6$, as the antecedent of the first ratio is to its consequent, so is the antecedent of the second to its consequent; and as the consequent of the first ratio is to another number 16, so is another number 3 to the antecedent of the second, *viz.* $4:16::3:12$; then will the antecedent of the first be to 16, as 3 to the consequent of the second, *viz.* $8:16::3:6$.

14. Suppose any four proportional quantities, *viz.* $3:6::12:24$; and any other four proportional quantities, $1:3::9:27$; if you multiply the several terms of the latter into

those of the former, the products will likewise be proportional, *viz.* $3:18::108:648$.

15. If there be several quantities continually proportional, A, B, C, D, &c. the first A is to the third C, in a duplicate ratio; to the fourth D, in a triplicate ratio, &c. of the first A to the second B.

16. If there be three numbers in continual proportion, the difference of the first and second will be a mean proportional between the difference of the first and second term, and the difference of the second and third, and the first term.

PROPORTION, in *Musick*, equality between two ratios. There are four kinds of proportion: arithmetical, geometrical, harmonical, and contra-harmonic. In order to comprehend all these proportions, it is necessary to understand the calculations with which authors have loaded the theory of music.

PROPORTION, *Harmonical* or *Musical*, is a third kind of proportion formed out of the other two, thus: of three numbers, if the first be to the third as the difference of the first and second to the difference of the second and third; the three numbers are in harmonical proportion.

Thus 2, 3, 6, are harmonical, because $2:6::1:3$. So also four numbers are harmonical, when the first is to the fourth as the difference of the first and second to the difference of the third and fourth.

Thus 24, 16, 12, 9, are harmonical, because $24:9::8:3$. By continuing the proportional terms in the first case, there arises an harmonical progression, or series.

1. If three or four numbers in harmonical proportion be multiplied or divided by the same number, the products or quotients will also be in harmonical proportion: thus, if 6, 8, 12, which are harmonical, be divided by 2, the quotients 3, 4, 6, are also harmonical; and reciprocally their products by 2, *viz.* 6, 8, 12.

2. To find an harmonical mean between two numbers given; divide double the product of the two numbers by their sum, the quotient is the mean required; thus suppose 3 and 6 the extremes, the product of these is 18, which doubled, gives 36; this divided by 9 (the sum of 3 and 6), gives the quotient 4. Whence 3, 4, 6, are harmonical.

3. To find a third harmonical proportional to two numbers given.

Call one of them the first term, and the other the second; multiply them together, and divide the product by the number remaining after the second is subtracted from double the first: the quotient is a third harmonical proportional: thus, suppose the given terms 3, 4, their product 12 divided by 2 (the remainder after 4 is taken from 6, the double of the first), the quotient is 6, the harmonical third sought.

4. To find a fourth harmonical proportional to three terms given: multiply the first into the third, and divide the product by the number remaining after the middle or second is subtracted from double the first; the quotient is a third harmonical proportional: thus supposing the numbers 9, 12, 16, a fourth will be found by the rule to be 24.

5. If there be four numbers disposed in order, of which one extreme and the two middle terms are in arithmetical proportion; and the same middle terms, with the other extreme, are in harmonical proportion, the four are in geometrical proportion: as here, $2:3::4:6$, which are geometrical; of which, 2, 3, 4, are arithmetical, and 3, 4, 6, harmonical.

6. If betwixt any two numbers you put an arithmetical mean, and also an harmonical one, the fourth will be in geometrical proportion: thus, betwixt 2 and 6, an arithmetical

mean is 4, and an harmonical one 3; and the four 2 : 3 :: 4 : 6, are geometrical.

We have this notable difference between the three kinds of proportion; that from any given number we can raise a continued arithmetical series increasing *in infinitum*, but not decreasing; the harmonical is decreasable *in infinitum*, but not increasable; the geometrical is both.

PROPORTION, *Contra-harmonical*. See CONTRA-HARMONICAL.

PROPORTION, *Extreme and Mean*. See EXTREME.

PROPORTION, *Inordinate*. See INORDINATE.

PROPORTION, *Reciprocal*. See RECIPROCAL.

PROPORTION *of Equality*. See EQUALITY.

PROPORTION, *Composition of*. See COMPOSITION.

PROPORTION, *Rule of*. See RULE.

PROPORTION, *Terms of*. See TERM.

PROPORTION is also used for the relation between unequal things of the same kind, by which their several parts correspond to each other with an equal augmentation, or diminution.

Thus, in reducing a figure into little, or enlarging it, care is taken to observe an equal diminution, or enlargement, through all its parts; so that if one line, *e. gr.* be contracted by one-third of its length, all the rest shall be contracted in the same proportion.

The making of reductions of this kind is the great use of the proportional compasses.

PROPORTION, in *Law*. See PRO RATA and ONE-RANDA.

PROPORTION, in *Architecture*, denotes the just magnitude of the members of each part of a building, and the relation of the several parts to the whole; *e. gr.* of the dimensions of a column, &c. with regard to the ordonnance of the whole building.

One of the greatest differences among architects, M. Perrault observes, is in the proportions of the heights of entablatures with respect to the thickness of the columns, to which they are always to be accommodated. See ENTABLATURE.

In effect there is scarcely any work, either of the ancients or moderns, in which this proportion is not different; some entablatures are even nearly twice as high as others; yet it is certain, this proportion ought of all others to be most regulated: none being of greater importance, as there is none in which a defect is sooner spied, nor any in which it is more shocking.

PROPORTION is likewise understood of the magnitudes of the members of architecture, statues, or the like, with regard to the distance whence they are to be viewed.

The most celebrated architects are much divided in their opinions on this subject; some will have it, that the parts ought to be enlarged in proportion to their elevation; and others, that they ought to remain in their natural dimensions. See STATUE.

PROPORTION, in *Painting*, is the just magnitude of the several members of a figure, a group, &c. with regard to one another, to the whole figure, the group, and the entire piece.

Proportion makes one of the most important articles in the art of painting, the principal subject it is employed in being the human body: for which reason, the curious in that art will not be displeas'd with the following scheme of the rules and laws of it.

By the way let it be observed, 1. That to measure and set off proportions, they either divide the module into twelve parts, and subdivide each of these into four; or else they divide the face into three lengths of the nose, subdivi-

ding each length into twelve; or, lastly, divide the whole face into three, and subdivide each of those into four; which last method is what we shall here follow.

2. That the multiplicity of little measures is to be studiously avoided, because they confound, and because they require great skill in osteology to hit justly.

3. That in measuring there be a regard had to the relief or juttings out of figures.

PROPORTION, *Rules of*. In the proportions of the human figure, regard is had to the *age, sex, and quality*. See FACE.

As to *age*, we consider the stages of it, infancy, youth, and manhood. For the first, at three years of age, we count five lengths of the face from top to toe; *viz.* from the tip of the head to the bottom of the belly, three; thence to the foot, two; breadth about the shoulders, one face one-eighth; and in the place of the hips, one face.

At four years, the height is six faces one-third; *viz.* from the top of the head to the bottom of the belly, three faces one-third; thence to the sole of the foot, three faces; the breadth about the shoulders, one face two-thirds; about the haunches, one face one-third.

At five years, the height of six faces one-half, one-third abated, the lower being shorter.

In youth, at twelve years, we have two proportions; the one from nature, which gives nine faces for the height; for the breadth about the shoulders, two faces; about the haunches, one face one-third; the other from the antique statues, as that of Laocoon, &c. which gives the height, ten faces one-half; the breadth from one shoulder to another, one face two-thirds; at the haunches one face two-thirds; at the place of the muscle called *vastus externus*, two; at the thigh, one; the knee, two-thirds and one-half, a subdivision; and at the ankles, one-third.

In the state of manhood, when the proportions are arrived at perfection, we reckon the height ten faces; the first, from the top of the head to the nostril; the second, to the hole in the neck between the clavicles; the third, to the pit of the stomach, called *cartilago ensiformis*; the fourth, to the navel; the fifth, to the pyramidal muscles; thence to the knee, two faces two-thirds; and as much to the sole of the foot. The extent of the arms is the same with the height; *viz.* from the tip of the long finger to the joint of the wrist, one face; thence to the elbow, one face one-third; thence to the juncture of the shoulders, one face one-third; thence to the hole in the neck, one face one-third; in all, five heads: which, with the five of the other arm, give ten: the thickness of the arms to be adjusted by the quality or character.

As to the breadth of the figure seen frontwise, the width of the shoulders across the deltoides is two faces two-thirds; breadth of the pectoral muscle, to the juncture of the arm, two. About the haunches, where the obliqui externi are, one face two-thirds, and the subdivisions. The thighs, at the biggest place, one. The knee one-third, three subdivisions one-half. The leg, at the thickest, two-thirds, and one subdivision. The extreme of the ankle one-third, one subdivision one-half. The feet, one-third, and one-half a subdivision. Their length, one face one-third, one subdivision. Others, measuring by the length of the whole head, make only eight heads in height and breadth, thus; the head, one; thence to the bottom of the breasts, one; thence to the navel, one; thence to the yard, one; thence to the middle of the thigh, one; thence to the lower part of the knee, one; thence to the small of the leg, one; thence to the bottom of the foot, one.

The breadth thus: from the end of the long finger to the wrist,

wrist, one; thence to the bend of the arm, one; thence to the bottom of the shoulder, one; thence over to the other shoulder, two; thence to the end of the other long finger, three.

To these general proportions may be added others, which usually obtain; as, that the hand is to be of the length of the face, the thumb the length of the nose; and the great toe the same; the two nipples, and the hole in the neck, make a just equilateral triangle; the space between the eye is the breadth of an eye; the breadth of the thigh, at the thickest, is double that of the thickest part of the leg, and treble that of the smallest: from the top of the head to the nose, the same as from the top of the nose to the chin. The distance from the chin to the throat-pit, is the breadth of the throat; the distance of the centre of the eye to the eye-brow, the same as the prominence of the nostrils, and the space between them and the upper lip; the length of the fore-finger the same as the space thence to the wrist; the space from the tip of the fore-finger to the wrist, the length of the face.

For the *sex*, the proportions of man and woman differ in height, in that the woman has a longer neck; the parts at the breasts, and the lower parts of the belly, bigger by half a part; which makes the space from the breast to the navel less by one part; and the thigh shorter by a third part.

As to breadth, a woman hath her breasts and shoulders narrower, and her haunches larger; and thighs, at the place of their articulation, larger; arms and legs thicker, feet straighter; and because women are more fat and fleshy, their muscles are less seen, and therefore the contours are more smooth and even.

Young maids have little heads, long necks, low or down shoulders, slender bodies, haunches big, legs and thighs long, feet little.

Young men have the neck thicker than women, the shoulders and breasts larger, the belly and haunches narrower, legs and thighs slenderer, and feet larger.

As to the *quality* of subjects, we are either to follow simple nature, or fine and agreeable nature, or to choose nature, or exceed it. In following *simple* nature, in common and country subjects, men of dull wit, and a moist temperament, are to be of a heavier and rougher proportion, the muscles appearing but little distinguished, the head big, neck short, shoulders high, stomach little, knees and thighs thick, and feet large.

In nature, as *fine* and *agreeable*, for serious histories, &c. the figures of the heroes to be well shaped, the haunches high and upright, the joints well knit, little, and compact, and free from flesh and fat.

Military men are to have their head little, neck thick and nervous, shoulders large and high, body and paps elevated, haunches and belly little, thighs muscular, principal muscles raised up and knit together at the heads; the legs smooth, feet slender, soles hollow.

Nature is sometimes to be *selected*, *i. e.* made up of parts from various good originals, to form extraordinary and perfect figures for great and heroic subjects; as in Roman histories; giving, thus, a character of force sufficient to execute actions agreeable to the description the poets, &c. make.

Lastly, sometimes nature is to be *exceeded*, as in representations of fabulous deities, of heroes and giants: in these the great pieces, which serve to form the body, are to be set out in measures agreeable to the height; only diversifying them by the bigness.

In the rule of proportions, it is to be observed, that there is a difference in the contours of some parts, when put in different postures: thus, when the arm is bent, it is larger than when straight; and the same is true of the foot and knee, as is shewn by Leonardo da Vinci.

PROPORTION, *Rule of*, in *Arithmetic*, a rule whereby we find a fourth proportional to three numbers given.

This is popularly called the *golden rule*, and sometimes the *rule of three*.

PROPORTION, *Compass of*, a name by which the French, and after them some English authors, call the *sector*. See its construction and use under the article SECTOR.

PROPORTIONS, *Definite*, in *Chemistry*, the limited proportions in which the elementary bodies combine, to form compound bodies.

When the constituents of any compound are presented to each other under the most favourable circumstances, they are found to unite in certain definite proportions. If one of the elementary bodies be in excess, the proportions of the compound will not be varied, except by some definite quantity. The excess will always be found distinct from the compound. When metallic zinc is added to sulphuric acid and water, the oxyd of zinc, formed at the expence of the water, continues to be dissolved by the acid to a certain point, beyond which no more of the metal will be dissolved, whatever quantity may be present. If to a given quantity of nitric or muriatic acid, lime be added from time to time, the lime will be dissolved in the acid, forming a transparent solution. This, however, can go on only to a limited extent. Beyond this point, if more lime be added, it will fall to the bottom of the vessel, and will not be changed. If oxygen and hydrogen gases be mixed in any other proportions by volume, than one of the former to two of the latter, and exploded by the electric spark, the excess of the one will remain unchanged in its gaseous form. Numerous examples might be quoted to shew the truth of this law of mutual saturation, while very few, if any, can be adduced to prove the contrary. This law is found to be more conspicuous where the strength of chemical affinity is great, as in the oxydation of metals, and the formation of salts.

It is rather remarkable, that chemists, with so many facts before their eyes, have frequently adopted a loose language, completely at variance with all these facts. We often read in chemical books, of salts having slight excesses of acid or base, and of metals oxydated by slight degrees; at the same time that they were aware, agreeably to the general opinion, that each of the salts afforded an uniform analysis, under whatever circumstances they were formed, and that each of the metals had a determined number of oxyds, in each of which the doses of oxygen were uniform.

No one seems to have investigated this important branch of chemical science, till the cause of limited proportions began to be sought for. We may with great truth assert, that twenty years ago no chemist had an idea that the proportions of compound bodies would ever be obtained with more accuracy than is afforded by analysis. We may see, that Bergman and Black were aware that bodies combined in limited doses or proportions. Richter adopted numbers to express the quantities of each of the acids to saturate a given quantity of base. Mr. Higgins of Dublin, in a work entitled "A Treatise on Phlogiston," makes use of the language of atoms, or particles, in a way that proved he had a clear idea of the laws of definite proportions, but not to a greater extent than was known to Bergman and Black. So little had he any idea of its real importance, that he does not even dwell in particular upon it; so that nothing more is known

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known of his opinions, than what is gathered from the language used to shew the inconsistency of the phlogistic theory. In some parts of his work he adopts a language very discordant with the laws of limited proportions, so much so, that if it had been found that bodies unite in any proportion, Mr. Higgins might have had an equal claim to prior discovery.

What had hitherto been done in the theory of definite proportions, did not admit of being used to any advantage in chemical science. Mr. John Dalton of Manchester was the first who gave it a systematic form. Richter, although he found that the relative quantities of the acids to saturate a given quantity of base might be expressed by numbers, did not seem to be aware, that all bodies susceptible of combination might be expressed by numbers, which would determine the ratios of the component parts. This theory, which has been strongly confirmed by facts, is as important in chemical science, as a knowledge of the laws of motion is to mechanical science.

It is worthy of remark, that many of our modern discoveries have been anticipated by the comprehensive mind of sir Isaac Newton. In the latter part of the 31st query to his Optics, at a time when so little was known of chemistry, he not only points out and develops the laws of chemical affinity, but he lays the foundation of the theory since discovered by Dalton, and to a certain extent embraced by the most eminent chemists of the present day. The passage is so remarkable, that we feel justified in giving a quotation of the most striking part.

After speaking of the laws of chemical attraction, he proceeds as follows (page 375.): "All these things being considered, it seems probable to me, that God in the beginning formed matter in solid, massy, hard, impenetrable, moveable particles, of such sizes and figures, and with such other properties, and in such proportion to space, as most conduced to the end for which he formed them; and these primitive particles being solids, are incomparably harder than any porous bodies compounded of them; even so very hard as never to wear or break in pieces: no ordinary power being able to divide what God himself made one in the first creation. While the particles continue entire, they may compose bodies of one and the same nature and texture in all ages; but should they wear away or break in pieces, the nature of things depending upon them would be changed. Water and earth composed of old worn-out particles, and fragments of particles, would not be of the same nature and texture now with water and earth composed of entire particles in the beginning. And, therefore, that nature may be lasting, the changes of corporeal things are to be placed only in the various separations and new associations and motions of these permanent particles, compound bodies being apt to break, not in the midst of solid particles, but where those particles are laid together, and only touch in a few points."

Although sir Isaac Newton, with mathematicians in general, might conceive the infinite divisibility of matter, he seems to have been well aware, that in nature its divisibility is limited to the hard and impenetrable atoms to which he alludes in the above quotation. The idea of atoms which are hard and unchangeable appears very plausible, even in the aggregation of a mass of simple matter. We cannot well account for the change of volume from change of temperature, without supposing the body to be constituted of atoms or particles, placed at different distances from each other, by the change of force existing in them, which is always the difference between the attraction of the atoms, and the repul-

sion of the caloric with which they are surrounded. How much more, however, the existence of definite atoms appears probable in the contemplation of a compound body. Nothing is more evident, than that the composition must commence with masses of the elementary matter of some magnitude. If their magnitude were to vary under different circumstances, and to any extent arising from the infinite divisibility of matter, there would not only arise an infinite number of compounds of the same elements, from a variety in their proportions, but we should find compound bodies to vary even with the same proportion of their elements, owing to a different size in the integrant particles. We find, however, in nature, that the proportions of bodies are definite, and we have no instance of compound bodies being different in their properties, when they afford the same analysis. Hence we have strong grounds to conclude with the great luminary of science, that matter is not infinitely divisible, and that all simple bodies consist of small masses, which are called atoms, beyond which divisibility is impracticable, and that in the composition of simple matter the union takes place between these primitive atoms only, and not between any other masses greater or less than them.

Mr. John Dalton, whose industry and patience can only be equalled by his ingenuity and profound thinking, began with the idea of primitive atoms, which combined with each other to form the different compounds. He supposes the simple atoms to be spherical, and that they can only combine 1 atom to 1, 1 to 2, 1 to 3, and so on; the number of atoms of one element being some multiple by a whole number of the atoms of the other: so that it would be absurd to suppose that an atom can be divided, or that 2 can unite with 3, 3 with 4, and so on. It is from this impossibility that the proportions of bodies are limited. We will endeavour to illustrate this theory by several examples. Hydrogen is found to enter into compounds in less proportion than any known element; hence it is concluded to be the least of all the atoms of the known simple matter. On this account Mr. Dalton has fixed its weight at 1, or unity. If, in the composition of water, which appears to be the only compound of oxygen and hydrogen, we call the hydrogen 1, we must call the oxygen 7. The latter is therefore used to express the relative weight of the atom of oxygen. In the analysis of the first oxyd of lead it is found to consist of 95 of lead, and 7 of oxygen, in 102 parts. It may be inferred that the relative weight of the atom of lead is 95, or 95 times heavier than hydrogen. Again, if galena, or the sulphuret of lead, which contains the least proportion of sulphur, afford on the analysis of 109 parts, 95 of lead, and 14 of sulphur, it is inferred that the atom of sulphur is 14 times heavier than hydrogen, and 14 will be therefore the number to represent the weight of an atom of sulphur. In burning carbon in oxygen gas, the bulk of the gas is not changed, but its specific gravity is increased from 14 to 19.4. This proves that the carbon, added to 14 of oxygen, to form carbonic acid, is 5.4. Hence the weight of the atom of carbon is rated by Mr. Dalton at 5.4. In like manner, the relative weights of the atoms of the other inflammable bodies may be found, knowing the quantity of oxygen with which they combine, and whether the oxyd contains the least proportion of oxygen. If the oxyd be the first oxyd, and the oxygen be 7, the weight of the inflammable base will be the number for its atom. If it be in the second stage of oxydation, then call the oxygen 14, and the weight of the inflammable base reduced to the same ratio will be the weight of the atom of the same. Of this we shall say more

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more hereafter. We will now point out the inferences to be drawn from the above facts, which will at once develop the beauty and importance of the atomic theory, as laid down by Mr. Dalton. The numbers being found for hydrogen 1, oxygen 7, sulphur 14, lead 95, and carbon 5.4; it will follow, that the proportions in which oxygen and hydrogen unite to form water, are 7 to 1. Lead and oxygen, to form the protoxyd of lead, will be 95 to 7; to form the deutoxyd of lead, 95 to 2×7 . This will be obvious, since nothing less than a whole atom of oxygen, which is 7, can combine with an atom of lead; and hence the limitation of the proportions. We shall also see that lead cannot combine with sulphur, except in the proportions 95 to 14, 95 to 2×14 , and so on, since no less than 14 of sulphur can be added or combined with the lead. Carbonic oxyd contains the least proportion of oxygen, and since the atom of carbon, if oxygen be called 7, must be called 5.4, we are to conclude that no less than 7 of oxygen can combine with 5.4 of carbon: this forms the carbonic oxyd. The next portion of oxygen must be 7 more, which will give 5.4 to 2×7 . This gives the carbonic acid. All this was well known to chemists before the researches of Dalton, but he was the first to point out the means by which the composition of other compounds may be inferred, without the aid of experiment. The compounds we have just given are the results of experiment as regarding the least proportion, but the atomic theory will enable us to go farther. We have, in the above, for instance, no experimental data for the combinations of sulphur with oxygen, hydrogen, or carbon, nor for carbon with hydrogen. But it will be found that the numbers given will express the ratios of these compounds as correctly as those derived from experiment. For instance; sulphur, when combined with oxygen in the least proportion, will be 14 to 7; the next stage will be 14 to $2 + 7$, forming sulphurous acid; the third, 14 to $3 + 7$, which gives sulphuric acid. Sulphur, with hydrogen in the least proportion, will be 14 of sulphur to 1 of hydrogen, forming sulphuret of hydrogen. The compounds of carbon with sulphur will be 5.4 carbon to 14 of sulphur, the first compound; and 5.4 to 2×14 , for the second: the latter gives the component parts of the volatile liquid, formerly called alcohol of sulphur, and now properly called super-sulphuret of carbon.

It will appear from the above statement, that if by analysis we can obtain a number for each of the elementary bodies, which is only a distant approximation to the truth, these numbers will become corrected by trying them with all their different combinations, till they finally agree among themselves. This will fix the science of chemistry upon a mathematical basis. Experiment, which in chemistry was till lately considered the only test of truth, will be now considered as a rude approximation, minute accuracy depending upon calculation.

It will be obvious, that the number which will express the weights of the atoms of the compound bodies, will be equal to the sum of the weights of the elementary atoms. For instance, the weight of the atom of sulphuric acid will be 14 sulphur, added to 3×7 oxygen, equal to 35. In the same way, the weight of the atom of oxyd of lead will be 95 added to $7 = 102$. The sulphate of lead will now be formed by 35 of sulphuric acid, added to 102 of oxyd of lead, equal to 137, which is the weight of the atom of this salt.

In order to give greater clearness to this theory, Mr. Dalton has used symbols to represent the elementary atoms, which he combines together to make compound symbols

representing the compounds. The general character is a circle. The atoms are distinguished from each other by signs or letters placed within them. This method gives a much clearer idea of the constitution of bodies than can be conveyed by any language, particularly to those commencing the study of chemistry. Mr. Dalton's reason for using the circle as his general character is, from its near analogy to spherical particles of simple bodies. This idea holds good with binary and ternary compounds only; the quaternary compound being a tetrahedron, cannot be written upon paper, except by perspective representation. In the representation of a salt, the symbol could not at all represent the form of the geometrical solid which would be formed in nature, and therefore might as well be represented by some symbol in which the elementary symbols are more simple. For this purpose we would recommend, as the general character, the half of a square divided diagonally. The bodies are distinguished by figures within the half square of the inflammable bodies, that for oxygen being blank. If it should be confirmed that there are other bodies of the same class with oxygen, as is supposed by sir Humphry Davy, they may be represented by placing letters in the half square.

The atomic theory, as advanced by Dalton, was for some years treated almost with ridicule. Some agreed with him so far as it admitted the doctrine of definite proportions, but did not hold with him in the atomic hypothesis, as regarded his numbers being the ratios in which the elements existed in any compound, although it completely explained the well-known fact of the neutrality of two salts, after mutual or double decomposition. Among his strenuous opposers, sir Humphry Davy was not the least conspicuous. Previous, however, to writing his "Elements of Chemical Philosophy," he became a warm advocate for the doctrine of definite proportions, and adopted a set of numbers to express the relative proportions in which simple bodies combine.

What, however, is very strange, he denied the existence of definite atoms, or at least appeared to do so in some remarks which occur in his work. Yet he admits, that masses of some magnitude unite to form compounds, to which he gives the appellation of proportions. He uses this word precisely in the same sense in which Dalton uses the word atom, and if he had not particularly objected to this part of Dalton's theory, we should have thought he had entirely adopted it.

What does sir Humphry mean to convey by the word proportion, different from the idea conveyed by atom? Does he suppose that masses of different magnitudes, of the same simple matter, may unite to form a compound? This cannot be the case, since such data would establish the idea of an infinite number of compounds varying in their proportions, and an infinite number varying in their mechanical structure, from a difference in the magnitudes of the ultimate elementary masses. The idea of definite proportions cannot for a moment exist, without the admission of the fact, that compounds are never formed but by the union of atoms, which are unchangeable in their figure, weight, and dimensions. Nothing, therefore, can be more absurd, than to admit the doctrine of definite proportions, without admitting the existence of definite atoms.

The numbers of sir Humphry's proportions agree with Dalton's in a few instances only. They each make hydrogen unity. Sir Humphry, for reasons best known to himself, has doubled the weight of Dalton's oxygen, making it 15; and in order to make this agree with the combination of oxygen, he has nearly doubled the weights of the inflammable bodies. In order to make this arrangement explain the

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the composition of water, he holds it to be composed of 2 atoms of hydrogen with 1 of oxygen, while Dalton holds them to be 1 to 1. His atom of azote, which is 26, is a little more than four times greater than Dalton's, which has obliged him to make nitric acid consist of 1 atom of azote and 5 of oxygen, and ammonia to consist of 1 atom of azote with 6 of hydrogen. It is difficult to imagine how so many atoms of hydrogen of such great elasticity should be retained upon an atom of azote, which has so little affinity for hydrogen. Dalton's atom of azote is 5, and he makes ammonia to consist of 1 atom of azote with 1 of hydrogen. His compounds of azote with oxygen are very simple, and agree with facts much better than by sir Humphry's numbers. Dalton's nitrous oxyd is formed by 2 atoms of azote with 1 of oxygen: his nitric oxyd by 1 of each. This explains the fact of nitrous oxyd being a heavier atom than nitric oxyd. Sir Humphry's numbers make nitrous oxyd the lightest of the compounds of azote with oxygen, which is inconsistent with fact.

Berzelius, a Swedish chemist, has established, by numerous experiments, the truth of the doctrine of definite proportions. He has given us a set of numbers almost entirely derived from his own facts. He, like sir Humphry, appears to reject the hypothesis of atoms, and makes use of the word volume in the same sense in which Dalton uses the word atom, and in which Davy uses the word proportion. His reason for adopting the word volume is founded on the pretended law of Gay Lussac, of gaseous bodies uniting in definite volumes. Hence Berzelius's numbers are the specific gravities of bodies in their gaseous form, under the same pressure. As for those bodies which do not assume the gaseous form at convenient temperatures, he determines the weight of their atoms by Dalton's method, and calls it the volume of the body, presuming, at the same time, that the same number would express the specific gravity of the body in the gaseous form. He begins his scale with oxygen, which he calls 100: that is, if any volume of oxygen be 100 in weight, the same volume of hydrogen will be 6.636; an equal volume of sulphur in the elastic form will be 201; a volume of phosphorus 167.512; one of arsenic 839.9, and of mercury 2531.6, and so on. Now, if all these bodies are capable of the elastic form at a moderate heat, it would, therefore, be important to know how far experiment would agree with this very ingenious idea. We see no reason why such an hypo-

thesis might not be defended, if there were no attraction between the particles of gases, and if their repulsion were uniform. This would occasion the distance of the particles to depend upon the pressure of the atmosphere, the particles would stand at equal distances from each other, and the specific gravity of equal volumes would be as the weight of the atoms.

It would also follow from this law, that the compounds in the gaseous form would possess a specific gravity, which would be equal to the sum of the specific gravities of these elementary gases. There are many striking facts in favour of this law, but there seem at present many insurmountable objections to it. Fortunately, to a certain extent, the subject is within the reach of experiment; and we are happy to learn it will soon be put to the test. Should this hypothesis completely agree with experiment, Berzelius can have no better ground than sir H. Davy for objecting to Dalton's doctrine of atoms. We can no more conceive how bodies should unite by volumes, than we can of any magnitude of one uniting to that of another. We have no instance of one grain or one ounce of one body uniting to any similar weight of another, to form a chemical compound. If the masses or volumes which unite were indefinite, the proportions could not be definite. It must, therefore, be the same ultimate atoms, to which Newton alludes, and which Dalton maintains, that enter into combination to form compounds, in order that the proportions may be limited. The atoms of Dalton, the proportions of Davy, and the volumes of Berzelius, must, therefore, be the same, so long as they all advocate the doctrine of definite proportions.

Dr. Thomson has given an account of the Daltonian theory in his Annals of Philosophy, in which he has made great alteration in certain numbers. This principally arises from his taking different authorities for the analysis of compounds. He has fixed the atom of oxygen at unity. His reasons for this are plausible. Oxygen enters into combination more frequently than any other of the elements, and it will be easier to add unity than any other number. If hydrogen were unity, oxygen would be a number much encumbered with decimals. Since the publication of the elementary numbers, Dr. Thomson has made some alterations, particularly in the atom of azote. We shall subjoin a table, exhibiting the numbers of Dalton, Davy, Thomson, and Berzelius.

TABLE of the relative Weights of Simple Atoms.

NAMES.	Symbols.	Elementary Numbers of				The same, Oxygen being 1.		
		Dalton.	Davy.	Berzelius.	Thomson.	Davy.	Dalton.	Berzelius.
Gold	Au	140.	—	2483.8	24.96		20.	24.838
Platinum	Pl	100.	—	1206.7	12.161		14.3	12.067
Silver	Ag	100.	205.	2688.17	12.62	13.3	14.3	26.8817
Palladium	Pa	—	134.	1407.56	14.2	8.9		14.0756
Mercury	Hg	167.	380.	2531.6	25.	25.4	23.9	25.316
Rhodium	Rh	—	—	1490.31	—	—	—	14.9031
Osmium	Os							
Iridium	I							
Copper	Cu	56.	120.	806.48	8.	8.	8.	8.0648
Iron	Fe	50.	103.	693.64	6.666	6.85	7.15	6.9364
Lead	Pb	95.	398.	2597.4	25.974	24.9	13.6	25.974
Tin	Sn	50.	110.	1470.59	14.7	7.31	7.15	14.7059
Antimony	Sb	40.	170.	1612.96	11.111	11.35	5.72	16.1296
Bismuth	Bi	68.	135.	1774.	8.994	9.	9.7	17.74
Zinc	Zn	56.	66.	806.45	4.315	4.4	8.	8.0645

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NAMES.	Symbols.	Elementary Numbers of				The same, Oxygen being 1.		
		Dalton.	Davy.	Berzelius.	Thomson.	Davy.	Dalton.	Berzelius.
Nickel	Ni	50.	111.	733.8	3.623	7.4	7.15	7.338
Tellurium	Te	—	74.	806.48	4.107	4.85	—	8.0648
Cobalt	Co	55.	166.	732.61	7.326	11.5	7.86	7.3261
Tungsten	Tn	56.	125.	2424.24	8.000	8.35	8.	24.2424
Manganese	Ma	40.	113.	711.575	7.130	7.5	5.72	7.11575
Titanium	Ti	40.	—	1801.	—	—	—	18.01
Uranium	U	60.	76.8	—	12.000	5.15	7.15	—
Cerium	Ce	45.	—	1148.8	11.494	—	6.43	11.488
Hydrogen	H	1.	1.	6.636	.132	.667	.143	6.636
Sulphur	S	13.	30.	201.00	.2	2.0	1.86	2.0100
Azote	A	5.	26.	—	1.803	1.73	.715	—
Muriatic radical	M	—	—	139.56	—	—	—	1.3956
Phosphorus	P	9.	20.	167.512	1.32	1.335	1.28	1.67512
Fluoric radical	F	—	—	60.	—	—	—	.60
Boron	B	—	—	73.273	—	—	—	.73273
Carbon	C	5.4	11.4	75.1	.751	.76	.77	.751
Arsenic	As	42.	90.	839.9	6.	6.	6.	8.399
Molybdenum	Mo	—	82.2	601.56	5.882	5.5	5.72	6.0156
Chromium	Ch	—	—	708.045	—	—	—	7.08045
Potassium	Po	35.	75.	978.0	5.	5.	5.	9.780
Sodium	So	21.	88.	579.32	5.882	5.75	3.	5.7932
Barium	Ba	61.	130.	1709.1	8.731	8.65	8.71	17.091
Strontium	Sr	39.	90.	1418.14	5.9	6.	5.56	14.1814
Calcium	Ca	17.	40.	510.2	2.62	2.77	—	5.102
Magnesium	Ms	10.	38.	315.46	1.368	2.54	2.43	3.1546
Aluminum	Al	8.	33.	228.025	1.	2.2	1.14	2.28
Glucinum	Gl	23.	39.	—	—	2.6	3.28	—
Yttrium	Y	46.	111.	881.66	—	7.4	6.55	8.8166
Zirconium	Zr	38.	70.	—	—	4.67	—	—
Silicum	Si	38.	61.	216.66	—	4.12	4.4	2.1666
Oxygen	O	7.	15.	100.00	1.	1.	1.	1.0000
Nitric radical	N	—	—	79.54	—	—	—	.7954
Chlorine	—	—	67.	—	—	4.47	—	—

Explanation of the Table.

The first column contains the names of the elementary bodies; the second, the symbols; the third, the numbers of Dalton, in which he considers hydrogen unity; the fourth column contains the numbers adopted by Davy, in which hydrogen is considered unity, and oxygen a little more than the double of Dalton's; in consequence of which, almost all the other elementary numbers have been also doubled. The fifth column contains the numbers proposed by Berzelius. He makes the number for oxygen 100. The sixth column contains the numbers proposed by Dr. Thomson. He fixes oxygen at unity: the rest of the numbers are derived from different authorities, and some from his own experiments.

The other three columns contain the numbers of Davy, Dalton, and Berzelius; the number for oxygen being reduced to unity.

These columns, with the sixth, serve to show how far the different authors agree. They will be found to correspond with sufficient exactness, to confirm the truth of the doctrine of definite proportions. It will be only by long comparing the elementary numbers with each other in the different compounds, that they can become perfectly correct. Analysis can only furnish a distant approximation to the truth of the numbers. Each elementary number will undergo greater correction, by tracing its progress through

all its combinations. In the four last columns it will be observed, that the numbers of one are sometimes about double that of another. This arises from a difference of opinion respecting the number of atoms combined. Berzelius conceives potash to be the second oxyd of potassium, and hence makes the number for potassium 9.78; while the others, who consider potash as the first oxyd, make the number to be 5, nearly half the former.

It must be observed, that some difference of opinion prevails among these philosophers, which it will be necessary to explain. The substance in the table called chlorine is held by sir Humphry Davy to be a simple body. Berzelius, and most other chemists, hold it to be a compound of what is called in the table muriatic radical and oxygen. The latter chemist is also of opinion, that azote is a compound of a peculiar base, which has been called *nitric radical* and oxygen. Davy's and Dalton's list do not contain the latter, nor do Dalton and Berzelius admit the chlorine of Davy into theirs. They are, however, all introduced into one column to save room.

Berzelius makes use of letters and figures, instead of arbitrary symbols, to express his simple and compound bodies. These will be more familiar to the reader than the characters of Dalton, or those we have proposed. We shall, therefore, omit giving any other than those of Berzelius. With these we shall give some examples of the compounds, according to the opinions of each of these philosophers. These

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are exhibited in the following table. The first column contains the names of the compounds. The second, third, fourth, and fifth contain the symbolic representation of each body, according to the opinions of each of the above

philosophers. The figures which precede, or are placed over a symbol, express the number of atoms of Dalton and Thomson, the number of volumes of Berzelius, and the number of proportions of Sir Humphry Davy.

TABLE of Simple Compounds.

NAMES.	Symbolic Compounds of			
	Dalton.	Davy.	Thomson.	Berzelius.
Sulphurous acid - - -	S + 2 O	S + 2 O	S + 2 O	S + 2 O
Sulphuric acid - - -	S + 3 O	S + 3 O	S + 3 O	S + 3 O
Nitrous oxyd - - -	2 A + O	A + O	A + O	N + O
Nitric oxyd - - -	A + O	A + 2 O	A + 2 O	N + 3 O
Nitric acid - - -	A + 2 O	A + 5 O	A + 5 O	N + 6 O
Nitrous acid - - -	(A + 2 O) + (A + O)	A + 4 O	A + 3 O	
Carbonic oxyd - - -	C + O	C + O	C + O	
Carbonic acid - - -	C + 2 O	C + 2 O	C + 2 O	
Phosphorous acid - - -	P + O	P + O	P + O	
Phosphoric acid - - -	P + 2 O	P + 2 O	P + 2 O	
Arsenic oxyd - - -		As + 2 O	As + 2 O	As + 3 O
Arsenic acid - - -		As + 3 O	As + 3 O	As + 6 O
Water - - -	H + O	2 H + O	H + O	2 H + O
Ammonia - - -	H + A	A + 6 H	2 H + A	6 H + N + O
Sulphuret of hydrogen - - -	H + S	S + 2 H	S + H	2 H + S
Phosphuret of hydrogen - - -	P + H	P + 2 H	P + 2 H	
First oxyd of lead - - -	Pb + O	Pb + O	Pb + O	
Second oxyd of iron - - -	Fe + 2 O	Fe + 2 O	Fe + 2 O	Fe + 2 O
Third oxyd of iron - - -	Fe + 3 O	Fe + 3 O	Fe + 3 O	Fe + 3 O
First oxyd of mercury - - -	Hg + O	Hg + O	Hg + O	
Second oxyd of mercury - - -	Hg + 2 O	Hg + 2 O	Hg + 2 O	
Second oxyd of copper - - -	Cu + 2 O	Cu + 2 O	Cu + 2 O	Cu + 2 O
Potash - - -	Po + O	Po + O	Po + O	Po + 2 O
Soda - - -	So + O	So + 2 O	So + 2 O	So + 2 O
Sulphate of potash - - -		—	SO ³ + PoO	SO ³ + 2 PoO ²
Sulphate of soda - - -		—	SO ³ + 2 SO ²	SO ³ + SoO
Sulphate of iron - - -	SO ³ + FeO	—	SO ³ + FeO ²	
Sulphate of copper - - -	2 SO ³ + CuO ²	—	2 SO ³ + CuO ²	2 SO ³ + CuO
Carbonate of potash - - -	CO ² + PoO	—	CO ² + PoO	
Bicarbonate - - -	2 CO ² + PoO	—	2 CO ² + PoO	
Nitrate of potash - - -	2 AO ² + PoO	—	AO ³ + PoO	2 NO ⁶ + PoO ²
Carbonate of lime - - -	CO ² + CaO	—	CO ² + CaO	

The preceding table contains only a very few of the compound bodies. In the present state of chemistry it would be impossible to give all the compounds correctly, for want of facts relative to the number of atoms in each compound, particularly in the salts. We have given this table to shew the method of combining the elementary symbols to express the compounds. When the constitution of all the compounds is known, a general list of the compounds expressed in a similar form might be of great importance to practical chemists, as it would not only shew the number of atoms or doses in each compound, but the proportions of the elements in round numbers may be immediately known. If we refer to sulphuric acid in the table of compounds, we shall see that in all the columns it consists of 1 atom of sulphur and 3 atoms of oxygen. By Thomson's numbers, in which oxygen is unity, we find in the elementary table that sulphur is 2, which added to 3 atoms of oxygen, is equal to 5. This is the number for the atom of sulphuric acid. In the table of compounds we find the second oxyd of copper to consist of 1 atom of copper, which in the table of simple bodies in Thomson's column, is 8, and 2 atoms of oxygen. These

added, give 10 for the atom of black oxyd of copper. If, now, we look in the table of compounds for sulphate of copper, we shall see that this salt is constituted by 2 atoms of sulphuric acid, 2 × 5, added to 1 atom of oxyd of copper 10, making 20 for the atom of sulphate of copper. These, however, give the salt free from water of crystallization. According to Dr. Wollaston's scale, this salt in its crystallized form contains 36 per cent. of water, so that it would be complete when formed of 2 atoms of sulphuric acid = 10, 1 atom of oxyd of copper = 10, and 10 atoms of water = 11.43, the atom of water being 1, atom of hydrogen = .143, and 1 of oxygen = 1, making 1.143; the whole atom of salt being 10 + 10 + 11.43 = 31.43.

In the table of compounds, we find carbonic acid constituted by 1 atom of carbon = 77, added to 2 atoms of oxygen = 2, making 2.77. In the same table we find potash formed by 1 atom of potassium = 5, added to 1 of oxygen = 1, making 6 for the atom of potash. If, now, we look in the table of compounds for carbonic acid and bicarbonat of potash, we shall find the former to consist of

1 atom of carbonic acid = 2.77, and 1 atom of potash = 6; the whole atom of this salt being 8.77. The bicarbonat will be seen to consist of 2 atoms of carbonic acid = $2 \times 2.77 = 5.54$, added to 1 of potash = 5, together being 10.54 for the atom of bicarbonat.

These examples will be sufficient to shew the importance of the atomic theory, particularly when we are in possession of a sufficient number of facts to form a complete table on a similar plan to those here given.

Before closing the present subject, a few observations may, with advantage, be added, on the value of the above doctrine as a means of improving the language of chemical science. Under the article NOMENCLATURE its general application has already been noticed; but this, as will be now seen, is capable of still farther extension than was then detailed. So complete is the system capable of being rendered, that if we merely remember the weight of the elementary atom of each acid and base of which a salt is composed, (a task by no means difficult,) the name of the compound alone will lead us to a knowledge of the proportions in which its ingredients are united. This, from what has been premised, will be obvious after a short illustration. When one atom of acid and one atom of base are employed in the constitution of any particular salt, as of phosphoric acid and of lime, for example, the title of the resulting compound, as was explained under NOMENCLATURE, is simply that of *phosphat of lime*. If two atoms of acid are present, it then becomes a *super-phosphat*, and if two atoms of base, a *sub-phosphat*. The addition of any farther number of particles may be conveniently registered by the aid of short prefixes derived from the Greek numerals. Thus, three atoms of either acid or base will be called a *trito-phosphat* (from τρίτος, *tertius*); four atoms, a *tetra-phosphat* (from τέταρτος, *quartus*); five atoms, a *pempto-phosphat* (from πέμπτος, *quintus*); six atoms, an *hexto-phosphat* (from ἕκτος, *sextus*); seven atoms, an *ebdo-phosphat* (from ἑβδομος, *septimus*); eight atoms, an *ogdo-phosphat* (from ὀγδοος, *octavus*); nine atoms, an *ennato-phosphat* (from ἑνάτος, *nonus*); and ten atoms, a *decato-phosphat* (from δέκατος, *decimus*). The same source will furnish a sufficient means of distinction to any increased extent; but there are few instances in which this will be requisite, and had it not been for some recent researches of Mr. Dalton into the various combinations of the salt here quoted, it might almost have been doubted whether even so great a provision as the above would have been at all necessary. One addition remains yet to be made to the foregoing nomenclature, as a means of distinguishing salts with excess of base from those with an excess of acid. This is readily accomplished by retaining the word *sub* as a prefix to the former, and reserving the names, as they stand above, without any alteration, to denote the latter. A compound of two atoms of phosphoric acid and one of lime, therefore, will be *super-phosphat of lime*, and three atoms of acid, and one of lime, *trito-phosphat of lime*. The combination of one atom of phosphoric acid with two of lime will, in like manner, be *sub-phosphat of lime*, and one of acid with three of lime, *sub-trito-phosphat of lime*; and so of the remainder.

PROPORTIONAL, relating to proportion. Thus we say, proportional compasses, parts, scales, spirals, &c. See COMPASSES, &c.

PROPORTIONALS, in *Geometry*, are quantities, either linear or numeral, which bear the same ratio, or relation to each other.

Thus, if 3, 6, 12, be proportionals, then will $3 : 6 :: 6 : 12$.

To find a fourth proportional to three given lines, A B, A C, and B D (Plate XI. *Geom.* fig. 13.) draw an angle F A G

at pleasure; from A set off the first of the lines to B; from A, the second, to C; and from B, to D, the third; draw B C; and at D make an angle equal to A B C; then is C E the fourth proportional sought; and $A B : A C :: B D : C E$.

If a third proportional be required to two given lines, A B and A C; make B D equal to A C; *i. e.* let A C be repeated twice: then $A B : A C :: A C : C E$.

To find a mean proportional between two given lines, A B and B E (fig. 14.), join the two given lines into one continued right line, and bisect in C. From C, with the interval of A C, describe a semicircle A D E; and from B erect a perpendicular B D; this is the mean proportional sought; and $A B : B D :: B D : B E$.

The geometricians have been these two thousand years in search of a method for finding two mean proportionals.

The ancients performed it mechanically, by the mesolabe described by Eutochius; and many of them attempted to give the demonstration; some by the solid loci, as Menechmus; others by the plain loci, as Nicomedes, Diocles, and, in our times, Vieta; and others by implicit motions, as Plato, Archytas, Pappus, and Sporus; others tentatively, by the description of circles, as Hero and Apollonius, &c. but all in vain. See DUPLICATION of a Cube.

To find a mean proportional between two numbers: half the sum of the two given numbers is an arithmetical mean proportional, and the square root of the product a geometrical mean proportional. See PROPORTION, *Arithmetical* and *Geometrical*.

To find a mean harmonical proportional, see PROPORTION, *Harmonical*.

PROPORTIONALS, in *Grammar*. See NUMERALS.

PROPORTIONAL Compasses, an instrument consisting of two equal and narrow thin slips of metal, terminating at each extremity in a point, the slips being connected together by a cylindrical pin, which, when they are made to coincide, is moveable along a slit through both pieces; so that the axis or centre of the pin, and the two extreme points of each piece, may be in the same straight line, and fixed at any point which will keep its situation in each of the pieces, whether the instrument be opened at any angle or shut.

The two surfaces of the instrument which appear when it is shut are called the sides.

The four parts of the instrument from the centre of motion are called legs.

It is evident from the definition given, that two legs will be equal to each other, and of the same invariable length, whatever angle these legs make with each other; and that the two which include the opposite angle will also be equal to each other, and their length also invariable at any angle formed by these legs.

Plate I. fig. 7. of *Drawing Instruments*, is the perspective representation of a pair of proportional compasses; *de* and *cf* are the two slips, constructed so as to turn round the centre of motion *a*, which remains in the same point of each slip *ce* or *df*, while the legs of the instrument are made to turn round it, but which may be moved when the adjoining surfaces of *ce* and *df* are made to coincide, and thereby divide the length of the instrument in any proportion required.

Fig. 8. is another proportional compass, with an adjusting beam or screw, so contrived as to move the slider the smallest quantity required, or to keep the instrument fixed at any angle in dividing a line of equal parts.

The application of the proportional compass with regard to the division of lines into any number of equal parts from 2 to 10, and the circumferences of circles into any number of

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equal parts from 6 to 20, and with regard to being used as a scale, has already been shewn under the article COMPASSES, as also some other applications with regard to its being used as a sector. In this article it is proposed to treat of its application to perspective, and some other branches of geometry and architecture, to which purposes it has never yet been applied.

PROBLEM I. *Fig. 1.*

To set the proportional compasses in the ratio of a line divided into any two parts.

Take a line equal to the length of the instrument, and divide this line in the ratio required; then apply the shorter or longer part of the line thus divided on the length of the instrument when shut, from the extremity of the longer or shorter legs to an intermediate point, to which bring the axis of the pin, and the compasses will be set in the ratio required. Thus, let AD be a straight line divided in E ; make AB equal to the length of the instrument; join DB , and draw EC parallel to DB , cutting AB at C ; shut the instrument; take either distance CA or CB , say the shorter, CB , and apply it from the shorter end of the instrument; push the slider along the slit until the centre of the pin coincides with the other extremity, and the instrument will be set in the ratio required.

As this problem is essential in most of the following, the reader is desired not to pass it, but to understand it thoroughly before he proceeds farther.

PROB. II. *Fig. 2.*

Given any number of lines, $AB, CD, EF, GH, \&c.$ (*fig. 2.*) to find a series of other lines, which will have the same ratio in every two corresponding lines, given one line ab of the series required, corresponding to AB of the series given.

Set the proportional compasses in the ratio of AB to ab by problem I.; then if AB be greater than ab , take the distance CD , with the remote extremities, and make cd equal to the distance contained between the near extremities, and ab will have the same ratio to cd , which AB has to CD : in like manner take the distance EF , with the remote extremities, and make ef equal to the distance contained between the points of the near extremities, and cd will have the same ratio to ef , that CD has to EF ; or ab will have the same ratio to ef , that AB has to EF , and thus the remaining lines $gh, \&c.$ will be found in the same manner; but if the line AB in the given series be less than ab , the given line of the series required, the lengths $CD, EF, \&c.$ must be taken with the shorter ends of the compasses, and the lines $cd, ef, \&c.$ made respectively equal to the corresponding distances contained between the extremities of the longer ends.

PROB. III. *Fig. 3.*

To divide a given line in the same proportion as another given line is divided.

Let AE be a given line, divided into the parts AB, BC, CD, DE , and let it be required to divide the line ae in the same proportion.

Set the compasses in the ratio of the whole lines AE and ae , then take the distances AB, BC, CD, DE , with the same legs which were applied in taking the distance AE , and with the other legs corresponding to the distance ae , make ab, bc, cd, de , respectively equal to the distance between the points of these legs, and ab, bc, cd, de , will have the same ratio to one another, that AB, BC, CD, DE , have to one another.

PROB. IV.

To divide a straight line, $AX, N^o 2$, in continued proportion, given the extreme part AB .

Set the compasses in the ratio of AX to BX by problem I.; contract the points of the longer legs to BX , then with the shorter legs cut off the distance XC ; again contract the distance between the points of the longer legs to XC , thus found, and with the shorter legs cut off the distance XD ; and thus by setting the distance between the points of the longer legs to the last distance found, the shorter legs will give the succeeding part by transferring the distance between the shorter legs from X towards A . By continuing this operation, as many points may be found as may be necessary for the purpose required; then $AB : BC : CD : DE : EF : FG, \&c.$; that is $AB : BC :: BC : CD$, and $BC : CD :: CD : DE, \&c.$

Any question in the rule of three may be resolved by the proportional compass and a plane scale: thus, suppose three articles of the same kind to cost two shillings; what will eight cost? Set the compasses in the ratio of 2 to 3 by problem I.; extend the points of the shorter legs to 8 on the scale; then apply the longer legs to the scale, and 12, the measure indicated, will be the fourth proportional, as required.

Where there is a great disproportion in the terms of the ratio, it would be more eligible to use two scales; thus, suppose it were required to find a fourth proportional to the numbers 30, 3, and 45, take any convenient scale for the antecedents 30 and 45, and any convenient larger scale for the consequents 3 and the answer; then by problem I. set the compasses in the ratio of the distance 30 on the scale of the antecedents to the distance 3 in the scale of the consequents; then take 45 from the scale of the antecedents with the legs first applied to the same scale, and the other legs will give the distance 4.5, or $4\frac{1}{2}$, the answer as required, by applying the distance between their points on the scale of the consequents.

By this any proportion, whether in lines or numbers, may be resolved.

PROB. V. *Fig. 4.*

Given two straight lines AB and CD , tending to an inaccessible point, and a point E in position, to draw a straight line through the point E , so that all the three straight lines AB, CD , and that which is required to pass through the point E , may have the point of concurrence.

Through the given point E , draw FG , meeting AB at F , and CD at G ; draw HI parallel to FG , cutting AB at H , and CD at I ; set the proportional compasses in the ratio of the two straight lines FG and HI ; then FG being greater than HI , take the distance GE with the longer legs, and make IK equal to the distance between the points of the shorter legs; draw a straight line through the points E and K ; then if the straight lines AB, CD , and EK be produced, they would have one common point of concurrence.

Corollary.—Hence, if AB and CD (*fig. 5.*) be two straight lines, and if E, G, I, L , be several points in a straight line PQ , meeting AB in P , and CD in Q ; then drawing any line RS parallel to PQ , cutting AB at R , and CD at S , and setting the proportional compasses in the ratio of PQ to RS ; then PQ being longer than RS , take the distances QE, QG, QI, QL , with the longer legs, and apply the distances contained between the points of the shorter legs respectively from S to F , from S to H ,
from

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from S to K, and from S to M; and drawing the lines EF, GH, IK, LM, the lines thus drawn would all have one common point of concurrence, if produced with AB and CD.

Fig. 12. shews the application of this problem and its corollary, in drawing the representations of the horizontal lines which regulate the heights of doors and windows in the perspective representation of a building, when the vanishing points of the sides *Ak* and *Ch* are not in the picture, and when all the points through which these lines pass are in the corner of the building, or any other convenient line.

PROB. VI. *Fig. 6.*

Given two straight lines AB and CD, tending to an inaccessible point, and any number of points E, G, I, in position, not in a straight line; to draw a straight line through each of the points E, G, I, tending to the same point with AB and CD.

Through the point E, draw any line AC; through the point G, draw LM parallel to AC, cutting AB at L, and CD at M, and through the point I, draw NO also parallel to AC, cutting AB at N, and CD at O; draw any line PQ parallel to AC; set the proportional compasses in the ratio of AC to PQ; take the distances CM, CO, with the longer legs, and make QR, QS respectively equal to the distances contained between the points of the shorter ends; draw RT, SU parallel to PQ, cutting AB in T, U; make Qe, Rg, Si, respectively equal to CE, MG, OI; and draw the straight lines Ee, Ii, Gg, and Ee, Ii, Gg, will tend to the same point with AB and CD.

Fig. 7. is added in order to shew the great use of these problems in perspective, and completely exemplifies problem VII., by shewing that if any section of the original object made by the plane of the picture be obtained, such as the mouldings on the face of a building, it will be very easy to draw lines from all the points of such a section that will tend to the proper vanishing point, two lines tending to the same point being given.

PROB. VII. *Fig. 8.*

Given the representation $a'' b'' c'' d'' e'' f''$ of the end of a right cylinder, the original having its axis parallel to the picture, the vanishing line VL of the plane of that end, through a given point *a* in any perpendicular $a'' a$ to VL, to draw the representation of the other end of the cylinder.

Let $a'' a$ cut the vanishing line VL at *u*; draw $b'' b, c'' c, d'' d, e'' e, f'' f$, parallel to $a'' a$, cutting VL respectively at *v, w, x, y, z*; set the proportional compasses in the ratio of $u a''$ to $u a$; then $u a''$ being greater than $u a$, take the distance *vb* with the longer legs, and make *vb* respectively equal to the distance contained between the points of the shorter ends; find the remaining points *c, d, e, f*, in the same manner, and through the points *a, b, c, d, e, f*, draw a curve, which will be the representation of the other end of the cylinder.

Or, if the base *abcdef* were given, the top would be found in the same manner by making the ratio of the shorter legs to the longer legs as $u a$ to $u a''$, and taking *vb* with the nearer extremities, and making vb'' equal to the distance of the remote extremities, and finding the remaining points c'', d'', e'', f'' , in the same manner.

In the same manner any section $a' b' c' d' e' f'$ may be found.

This application of the proportional compass is exceedingly useful in the representation of bows, when required in the fronts of buildings, as is shewn by *fig. 9*, which exhibits

the elementary lines of the perspective of a house. Here the horizontal terminations of the apertures are readily represented by only drawing perpendicular lines which may be the vertical terminations of the said apertures, and which would therefore be required at all events. The same description of words as in the problem, apply to this figure, as in figure 9, to which the problem refers.

PROB. VIII.

Given the representation of any point on the picture, and the intersecting and vanishing lines of the plane it is in, to find the height of a representative line, the original of which is parallel to the picture.

Set the proportional compasses in the ratio of the distance between the intersecting and the vanishing lines, and the distance of the point from the vanishing line, then take the length of the original line with the longer legs, and the opposite points will give the height of the line required.

Example.—Suppose the distance between the vanishing and intersecting lines to be three inches, and the distance between the representation of the point or foot of the line to be two inches, and the height of the original line to be six inches, required the perspective height of the same. Set the proportional compasses in the ratio of 3 to 2; extend the longer legs of the compasses to six inches, and the extent between the opposite shorter legs will be the height of the line required, which, in this case, will be four inches.

Scholium.—By this method all the heights of the representation of a solid may be found without any additional lines whatever; but in order to expedite the work when the original object is of different heights in the same plane parallel to the picture, or where the same height is required to be found upon two or more points, it will be eligible to draw a straight line through one of the points, cutting the one or more lines on which the heights are to be found, and the same setting of the compasses will do for as many heights as are to be raised upon the line so drawn.

Example.—Suppose a cylinder to be represented, its base is an ellipsis, to find any two points in the height of the cylinder; draw a straight line parallel to the vanishing line, to cut the representation of the base of the cylinder in two points; upon each point of section draw a perpendicular; set the proportional compass in the ratio of the distance between the intersecting and vanishing lines, and either point and the vanishing line; then take the height of the cylinder between the points of the long legs, and the distance of the opposite points, and the distance between the opposite points will give the perspective height upon each perpendicular from the foot thereof.

In the application which has hitherto been made of the proportional compasses, the sides of the instrument have not required any gradations of parts; the construction of the scales to be affixed on the proportional compass for this purpose is as follows.

PROB. IX.

To construct the scale of sines for the proportional compass. Let AC be a scale of sines, found in the usual manner; and let CA be produced to R, making AR equal to the radius; draw RD at any convenient angle with RC; make RD equal to the length of the proportional compasses, and join CD; draw Aq parallel to CD, and as q at the point C is the chord of 90, the point q in RD will be the point for the index of the slider to be set to; then if the legs of the compasses be set to any angle, the distance between the points corresponding to D will be to the distance between the points corresponding to R,

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as the sine of 90 is to radius. In like manner, join D 8 and the next point 8 in the line A C, and draw A 8 parallel to D 8, cutting R D in 8; then the point 8 in R D will be the point for the index of the slider to be set to; then if the ends of the proportional compasses corresponding to R be opened to any radius, the extent of the ends corresponding to D is the sine of 80 degrees corresponding to that radius: in like manner, the points 6, 5, 4, 3, 2, 1, will be found in R D, so that 1, 2, 3, 4, 5, 6, 7, 8, 9, in R D, are the gradations on the side of the proportional compasses corresponding to 10°, 20°, 30°, 40°, 50°, 60°, 70°, 80°, 90°; so that if the index be set to any of these numbers, and the points corresponding to R be extended to the radius, the distance between the opposite points will be the sine of that number of degrees. The cosines have the same divisions as the sines, but are numbered the contrary way.

In the same manner, by placing the radius in the same straight line with a common scale of sines or tangents from zero on A, so as to lengthen the line A C of tangents, by adding the said radius A R, and forming the extension R C, and drawing R D at any convenient angle with R C, then dividing B D as in the problem; then R D will contain the gradations of a scale of tangents, to be inserted on the side of the proportional compasses; so that when the index or mark upon the slider is brought to any of these numbers, the end corresponding to R being opened to the radius, the end corresponding to D will be the sine or tangent of the angle corresponding to that number. See the figure.

Fig. 10. shews the application of the method to a scale of tangents.

Examples.

Ex. 1. Fig. 13.—To make an angle of 30° at a given point A in the straight line A B.

With any convenient radius A B describe an arc B C; set the index to 30° on the line of chords, then extend the points of the instrument corresponding to B to the radius A B, and with the opposite points set off the distance B C on the arc, and join C A, then C A B is the angle required.

Ex. 2.—To find the tangent of 40° to any given radius within the limits of the points corresponding to R.

Set the index to 40° on the line of tangents, and extend the points R to the radius, then the extent between the opposite points will be the tangent of 40°, as required.

Ex. 3.—To find the sine of 20° to any given radius within the limits of the points corresponding to B.

Set the index to 20° on the line of sines, then extend the points corresponding to R to the radius given, and the extent between the opposite points will be the sine of the angle, as required.

Ex. 4.—To find the cosine of 50°, the radius being given within the limits of the instrument.

Set the index to 50° on the line of cosines; extend the points corresponding to R to the radius, and the opposite points will be the cosine of the angle required.

Ex. 5.—The chord, sine, cosine, or tangent of any number of degrees being given, to find the radius.

Extend the points corresponding to D to the chord, sine, cosine, or tangent, and the opposite points corresponding to R will be the radius of the circle required.

PROB. X.

To draw the representation of a house, by making the centre of the picture the dividing point, having the dimensions of the building given.

Fig. 12.—Let V L be the vanishing line, h k the intersecting line, and C the centre of the picture; and let the building touch the intersecting line in A, also let the vanishing points of the sides be supposed to be given.

Set the proportional compasses to the cosine of the angle which the one side of the building (*viz.* say that on the right) makes with the intersecting line by *Ex. 4. Prob. IX.* say 30°; then with the ends of the instrument corresponding to R, take the original measures from a plan; or if the measures are known in feet, &c. take them from a scale without being at the trouble of drawing a plan; take the distance of the corner of the building, and the nearest side (say 3 feet 6 inches) from the scale, with the remote points, and with the opposite points set off the distance A b on the intersecting line; take the breadth of the window from the scale (say 3 feet) with the remote points, and with the opposite points set off the distance b c on the intersecting line; take the breadth of the next pier from the scale (say 4 feet) with the remote points, and with the opposite points set off the distance c d: proceed in this manner to h, so that the whole extent A h will represent a distance of 24 feet. Let us now proceed with the end of the building, which is supposed to be on the left hand; as the angle of the building is supposed to be a right angle, and as the right-hand side was supposed to make an angle of 30° with the intersecting line, the left-hand side will therefore make an angle of 60°; set the index of the proportional compass to 60° in the line of cosines; then from the scale take the breadth of the end (say 20 feet) with the remote ends, and with the opposite ends set off the distance A k; set off the breadth of the piers from h to j, and from A to i in the same manner; draw the lines A h and A k to the vanishing points of the sides.

From the points b, c, d, e, f, g, h, as also from i, j, k, draw lines to C, cutting A b at b, c, d, e, f, g, h, and A k at i, j, k; from the points of section draw perpendiculars to V L; set the heights of the apertures, and the height of the building itself, upon the corner A A': say that the sills of the lower windows are three feet high, the windows six feet, the space between the lower windows and the upper four feet, the upper windows four feet also, and the distance to the parapet three feet; therefore make A l equal to three feet, l m equal to six feet, m n equal to four feet, n o equal to four feet, and o A' equal to three feet, exactly to the scale or natural measures of the building: from these points of section draw lines to the vanishing points, and complete the whole representation. In setting up the heights, common dividers may be used. By the last setting of the proportional compass, if the thickness of the walls are taken from the scale by the remote ends marked R, and the distance of the two opposite points be set upon the intersecting line from the points c, e, g, towards A; and if from the points of section lines be drawn to C, the centre of the picture, to cut the representative base line A b of the building, and perpendiculars be drawn from the points of section in A b, these perpendiculars will give the reveals of the windows, that is, they will shew the thickness of the walls on the sides of the windows.

PROB. XI. Fig. 13.

From a given point A, in a given straight line A B, to draw a straight line A C, so that A B and A C shall contain an angle of a given number of degrees.

Set the index of the proportional compasses to the chord of the angle; then from the point A, with any radius describe the arc B C of a circle; extend the longer legs to the radius A B, and with the opposite legs set off a chord

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BC upon the arc from the point B, where it cuts the leg, and draw the line AC, and BAC will be the angle required.

PROB. XII.

Given the vanishing line of a plane, its centre and distance, and the inclination of a line in that plane to the intersection, to find the vanishing point of the line, without having recourse to draw any lines in the vanishing plane.

Let the angle which the original line makes with the intersection be 30° ; subtract 30° from 90° , and 60° will remain; bring the index of the proportional compasses to 60° on the line of tangents; extend the extremities of the compasses marked R to the radius; then set the distance of the opposite extremities from C to v (*fig.* 14.), on the vanishing line VL, and v will be the vanishing point of the line, as required.

The proportional compasses will answer to any distance of the eye from the vanishing line, however great, by taking one-half, one-third, one-fourth, &c. of the distance of the vanishing line, as will be found most convenient with the extremities marked R; then repeating the distance between the points of the opposite extremities two times, three times, four times, &c. accordingly.

Example.—Let it be required to find the vanishing points of a rectangle, supposing the right-hand side to be placed at 40° with the intersecting line.

Subtract 40° from 90° , the number contained in a right angle, and the remainder, 50° , will give the angle made by the primary or shortest radial, and the radial of the right-hand side, or the angle made by the original side of the rectangle on the right hand, and a perpendicular in the original plane to the intersecting line; then the angle contained between the primary radial and the radial of the left-hand side of the rectangle will be 40° . Now suppose the length of the picture to be 12 inches, and the spectator to stand at 2 feet, or 24 inches, from the centre of the vanishing line; and suppose the proportional compasses to be $6\frac{1}{2}$ inches, which is the usual length: divide 24 into 6 equal parts, each of these parts in this instance will contain 4 inches; slide the index of the instrument to 50° on the line of tangents, then with the legs R take the extent of 4 inches, or the sixth part of 2 feet, and repeat the distance of the opposite points on the vanishing line from the centre C of the picture towards the right hand six times to v , and v will give the vanishing point. To find the vanishing point of the left-hand side: as the radial of this side makes 40° with the primary radial, slide the index of the instrument to 40° on the line of tangents; then with the legs marked R take the extent of 4 inches, or the sixth of 2 feet; then repeat the distance between the points of the opposite ends from the centre of the picture towards the left hand six times to V, and V will be the vanishing point of the left-hand side of the rectangle.

The vanishing points of all lines whatever may be found in this manner, having the angle formed by the intersecting line and the original: for this is always equal to the angle formed by the radial and the parallel of the eye; and because that the distance of a vanishing point from the centre of the picture is the tangent of the angle made by the primary radial and the radial of the line, the primary radial being radius, the proportional compasses being set as above, will give the true vanishing point.

Scholium.—None of the lines on the proportional compasses, except the tangents, require the slit to be less than half the length of the shank, deducting that part of the slide from the centre of the pin; the tangents therefore can-

not be inserted higher than 45° ; and indeed the higher tangential numbers would be of little use, as the radius would be shortened by every such increase: now this would be attended with greater inaccuracy and more labour. If the gradations, however, do not exceed 45° , the distance of the extremities of the compasses may still be extended to six inches: but in order to find the tangent of any greater number of degrees than 45, we have only to subtract that number of degrees from 90, and the remainder is the complement of the angle; then it will be as the tangent of the complement is to radius, so is radius to the tangent itself.

From these observations it will be very easy to find the vanishing point of any line, whatever number of degrees the radial of that line forms with the primary radial, as may be seen in the following problem.

PROB. XIII.

To find the vanishing point of a line, the radial of which makes a greater angle with the primary radial than 45° , the vanishing line and its centre being given, as also the primary radial.

Subtract the given angle from 90; set the index of the compasses to the tangent of the remaining angle; take a convenient aliquot part of the distance of the eye from the vanishing line, and set the legs marked R to that distance; and upon any straight line AE, with the ends R, set off the distance AB; take the distance AB with the opposite ends, and set off the distance AD; then let VL be the vanishing line and C its centre; then, according as the original line or its radial is on the right or left, the distance AD must be set to the right or left of the centre of the picture, as often as the radial is supposed to contain the distance of the points upon the legs marked R.

Example.—Suppose the radial of the line to make an angle of 50° with the primary radial, and the length of the primary radial to be three feet, to find the distance of the vanishing point from the centre of the picture.

Subtract 50° from 90° , and the remainder is 40° ; set the index to the tangent of 40° ; take the ninth part of the primary radial, or 4 inches, and extend the ends opposite to those marked R to 4 inches, or the ninth part of the distance, and repeat the distance of the legs marked R on the vanishing line nine times from the centre to the right or left hand accordingly, and the extremity of the distance so repeated from C is the vanishing point required.

The reason of this operation is evident, since the radius is a mean proportional between the tangent of the angle and the tangent of its complement, and therefore as the tangent of the complementary angle is to the radius, so is the radius to the tangent itself.

If the object to be drawn be a rectangle, making unequal angles with the intersecting line, the angles made by the radials of the sides, and the primary radial, being equal to the angles made by the sides of the rectangle and the intersecting line, or a line drawn through the other corner parallel to the intersecting line; set the proportional compasses to the tangent of the least angle; extend the legs marked R to the distance, or to any part of the distance that the compasses will admit of; set the distance of the opposite legs, or repeat that distance as often as the primary radial contains parts, from the centre to the right or left, and the point of extension will give the vanishing point of that side of the rectangle; extend the ends opposite to R to the primary radial, or that portion of it before-mentioned that the compasses will admit of, and the extension between the extremities of the legs marked R being set from the centre on the other side of it of the vanishing line, or repeated

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peated according to the number of parts into which the primary radial is divided, will give the vanishing point of the other side of the rectangle, viz. of that side which makes the greatest angle with a line perpendicular to the intersection, and therefore the vanishing point so found must be upon the same side of the centre of the picture that the angle itself is upon, being nothing more than the tangent of that angle.

Scholium.—The vanishing points of a rectangular building may be found arithmetically upon the foregoing principles; viz. as the tangent of the angle made by the radial of one side and the primary radial is to the primary radial itself, so is the primary radial to the tangent of the angle made by the radial of the other side and the primary radial. Now, admitting the shortest tangent was to the primary radial as 2 to 3, and the length of the primary radial was 3 feet 6 inches, or 42 inches; to find the vanishing points, it will be

$$3 : 2 :: 42$$

$$\begin{array}{r} 2 \\ \hline 3)84 \\ \hline \end{array}$$

28 inches, the distance of the vanishing point of the least angle. And again,

$$2 : 3 :: 42$$

$$\begin{array}{r} 3 \\ \hline 2)126 \\ \hline \end{array}$$

63 inches, the distance of the vanishing point of the greater angle; or because the distance is a mean proportional between the two tangents, it will be

$$28 : 42 :: 42$$

$$\begin{array}{r} 42 \\ \hline 84 \\ \hline 168 \\ \hline \end{array}$$

$$28)1764(63 \text{ inches, the tangent of the greater angle, the same as before.}$$

$$\begin{array}{r} 84 \\ \hline 84 \\ \hline \end{array}$$

The distance of the vanishing points is sometimes required. In this case, the square root of the sum of the squares of each tangent, and the primary radial, will give the distance from each respective vanishing point; but if the vanishing points are inaccessible, subtract each tangent from the respective distance so found, and set the remainder on each side of the centre of the picture.

This method of finding the distance would be thought by many artists rather troublesome. The following method, by the proportional compasses, is very easy: Suppose the one radial to make an angle of 30°, then the other will be 60° with the primary radial; add 30° to 90°, the sum is 120°; take the half of 120, which is 60; then 30 from 60, there remains 30°; the tangent of 30, set upon the other side of the primary radial, will give the distance of the vanishing point. Again, add 60 to 90, the sum is 150, the half is 75°; subtract 60 from 75, and the remainder is 15°; then the tangent of 15°, set from the centre of the picture on the other side of the angle of 60°, will give the distance of the vanishing point of the line that makes 30° with the intersection.

Again, suppose one of the angles 40°, the other will be 50°; add 40 to 90, the sum is 130; the half of 130 is 65; subtract 40 from 65, and the remainder is 25°; then the tangent of 25°, set on the other side of 40 from the centre of the picture, will give the distance of the vanishing point of the line, the radial of which makes 40 with the primary radial. Again, add 50 to 90, the sum is 140, the half is 70; subtract 50 from 70, and the remainder is 20°; then the tangent of 20° being set from the centre of the picture upon the other side of the angle formed by the primary radial, and the other radial containing 50, will give the distance of the said radial.

In general, suppose the less angle to be called v , and the greater w ; then $\frac{v + 90}{2} - v = \frac{90 - v}{2} = 45 - \frac{v}{2}$, then the tangent of this angle set upon the other side, gives the vanishing point of the same. Again, $\frac{w + 90}{2} - w = \frac{90 - w}{2} = 45 - \frac{w}{2}$, gives the distance of the other vanishing point set on the contrary side of the centre: thus, if $w = 60$, then $45 - \frac{w}{2} = 15$, then set the tangent of 15° as directed; and thus the tangent of the remainder of half the angle contained by the primary radial, and the radial from 45°, gives the vanishing point; or take the tangent of half the complement of the said angle, and set it on the vanishing line from the centre of the picture on the other side, and it will give the vanishing point.

PROB. XIV.

Given the angle which the radials of any two original lines make with each other, and the angle which one of them makes with the primary radial, to find a dividing point which shall be common to the same measures or scale, so as to cut off a portion from the indefinite representation of each line, such that the portions may be the representations of the two original lines.

N.B. When one of the angles which the primary radial makes with the one radial is given, that with the primary radial and the other radial may be found by subtracting the one given from the whole angle contained by the radials. This being obtained, proceed as follows: subtract the less angle formed by the one radial and the primary radial from half the angle contained by the radials of the original lines; then if the tangent of the remaining angle be set on the vanishing line, on the side of the primary radial which has the greatest angle, it will give the dividing point required.

Let us call the whole angle A , then the half is $\frac{A}{2}$; call the less angle made by the primary radial and the one radial B , then $\frac{A}{2} - B$ is the difference; find the tangent of $\frac{A}{2} - B$; then the greater angle made by the primary radial and the other radial being $A - B$, set the tangent of $\frac{A}{2} - B$ from C , on the vanishing line on the side of $A - B$, and the extremity of the distance will give the dividing point required.

Example 1.—Suppose the angle contained by the two radials to be 100°, and the lesser angle to be 40°, then the

PROPORTIONAL COMPASS.

greater will be 60° : now the half of 100 is 50; subtract 40° , the lesser angle, from 50° , there remains 10° : set the index of the proportional compasses to 10° on the line of tangents; take the length of the primary radial with the legs marked R, and set off the distance contained by the opposite points from the centre of the picture on the vanishing line, on the side of the primary which has the angle of 60° , and the extremity of the distance is the dividing point.

Example 2.—Suppose the angle contained by the radials to be 80° , the lesser angle to be 30° , and consequently the greater 50° ; the half of 80° is 40° ; subtract 30° from 40° , and 10° remain. Set the index of the proportional compasses to the tangent of 10° ; take the length of the radial with the legs marked R, and set the distance of the point contained by the opposite legs from C on the vanishing line, on the side of the angle of 50° , and the extremity gives the dividing point.

PROB. XV.

Given the sun's altitude on a plane, the height of a line, and the length of its shadow on that plane, the orthographical representation of a cornice, with a section of the same, also the seat of the sun's rays, to find the shadow of the cornice.

Let *fig. 15*, $N^\circ 1$, be the cornice or architrave, and $N^\circ 2$ be a profile or section perpendicular to the arrises, or edges of the mouldings; draw *bB* for the indefinite representation of the shadow of a line represented by the point *b*, $N^\circ 1$, and let *bB* be the distance the shadow is thrown from the point *b*, and consequently *B* will be the shadow of *b*: from all the external angles draw *cC*, *eE*, *gG*, *iI*. Now *kl*, $N^\circ 2$, is the length of the line represented by the point *b*, $N^\circ 1$: set the proportional compasses in the ratio of *kl*, $N^\circ 1$, to *bB*, $N^\circ 2$: make *cC*, $N^\circ 2$, equal to *bB*, $N^\circ 1$: take *op*, $N^\circ 2$, with the shorter ends, and make *eE*, $N^\circ 1$, equal to the distance between the points of the remote ends; take *qr*, $N^\circ 2$, with the shorter legs, and make *gG*, $N^\circ 1$, equal to the distance between the points of the remote ends; join *BC*; draw *CD* parallel to *Mc*, and draw *ED* parallel to *ed*; draw *EF* parallel to *eK*, and *GF* parallel to *gf*; draw *GH* parallel to *gI*, and *bBCDEFGHI* will be the shadow from one side; draw the lines *ML*, *KJ*, parallel to *bB*, *cC*, &c. to meet *Kb* and *Ii* at *L* and *J*, then will *ML* and *KJ* be the shadows upon the other side. To find the shadows upon the planes of the face: in the representation *cM* of the arris line, take any point, *v*, and draw *vw* parallel to *bB*, or *cC*, &c.; also, in the representation *eK*, of the next arris line, take any point, *x*, and draw *xy* parallel to *bB*, or *cC*; take the distance *dc* with the shorter ends of the proportional compasses, and make *vw* equal to the distance between the points of the longer legs; also take the projection *fe* with the shorter legs, and make *xy* equal to the distance contained between the points of the remote ends; through the points *w* and *y* draw *Lz* and *JQ* parallel to *Mc*, which will terminate the breadth of the shadow upon the face.

The reason of this operation is evident, since the distance that a shadow will be thrown by a line perpendicular to a plane, is as the length of the line; and the shadow of a line parallel to a plane will be projected on the plane parallel to the line which projects the shadow, and that every two parallel lines in the original object are also represented by parallel lines.

PROB. XVI.

The representation of a cylinder with a square abacus or cap being given, to find the shadow of the cap upon the

cylindric surface, the axis of the cylinder being parallel to the plane of projection, and the shadow of a line perpendicular to the axis of the cylinder, and in a plane passing along the said axis, and through the luminary.

Let *ABCDEFG* (*fig. 16.*) be the plan of the semi-cylinder, and *HIMN* that of the cap; and let *WXYZ* be the elevation of the semi-cylinder, and *imvu* that of the cap, and let *IB* be the projection or representation of a ray on the plan, from the corner of the abacus at *I*, cutting the plan of the cylinder at *B*; draw *LF* parallel to *IB*, to touch the semicircle in *F*, and to cut *IM* at *L*; draw *FV* perpendicular to *LF*, *V* being the centre of the semicircle, and *F* will be the point of contact; in *IM* take any number of intermediate points *J*, *M*, *K*, and draw *JC*, *MD*, *KE*, parallel to *IB*, cutting the semicircle in *C*, *D*, *E*; draw *Bp*, *Cq*, *Dr*, *Es*, *Ft*, parallel to the axis of the cylinder, cutting the under edge *im* of the abacus in *p*, *q*, *r*, *s*, *t*; set the proportional compasses in the ratio to the distance which *IB* will throw the shadow, and suppose *IB* to be greater than the length of its shadow; take the distance *IB* with the longer legs; make *pb* equal to the distance contained between the points of the opposite ends; take the distance *JC* with the longer legs, and make *qc* equal to the distance contained between the shorter legs; take the distance *MD* with the longer legs, and make *rd* equal to the distance contained between the opposite points; and the points *b*, *c*, *d*, will be obtained. In the same manner, the points *e* and *f* will be found; through the points *b*, *c*, *d*, *e*, *f*, draw a curve, and the curve thus drawn will be the shadow of the lower edge of the abacus; the sun's rays will be in a tangent plane to the cylindric surface at *Ff*. The part of the edge of the shadow which falls upon the representation of the cylindric surface from *i* to *b* will be straight.

In the same manner, if the representation of a cylinder capped with a cylindric abacus, having the same axis with the cylinder, be given, and the representation of the sun's rays on the plan, supposing the axis of the cylinder perpendicular to the plane of projection, the shadow of the abacus may be found upon the cylindric surface, and thus for every other prismatic object.

PROB. XVII.

To describe the logarithmic spiral by a series of points to be found in the curve, the centre, and two opposite points in a straight line passing through the centre, being given in the curve.

Let *Z*, *fig. 17*, $N^\circ 1$, be the centre, and let the straight line *AE* pass through *Z*, and let *A* and *E* be two opposite points, the one, *A*, on the one side, and the other, *E*, on the other side of the centre *Z*; through *Z* draw *GC* at right angles to *AE*; bisect the angle *AZC* by the straight line *BF*; also bisect the angle *EZC* by the straight line *DH*; find *ZC* a mean proportional between *ZA* and *ZE*; also find *ZB* a mean proportional between *ZA* and *ZC*; draw any straight line *aX*, $N^\circ 1$, and set the proportional compasses in the ratio of *ZA* to *ZB*; take the distance *ZA* with the points of the longer legs, and set that distance from *X* to *a*, $N^\circ 1$, and make *Xb* equal to the distance contained between the shorter legs; contract the points of the longer legs to *Xb*, and with the shorter legs set off the distance *Xc*; contract the distance between the points of the longer legs to *Xc*, and make *Xd* equal to the distance contained between the points of the shorter legs, and the parts *ab*, *bc*, *cd*, of the straight line *Xa*, will be in geometrical progression. In the same manner, the points *e*, *f*, *g*, *h*, *i*, &c. may be found, which will continue the series of parts as far as there may be any occasion; make *ZA*, $N^\circ 1$, equal

equal to Xa , $N^{\circ} 2$, Zb equal to Xb , ZC equal to Xc . In the same manner the points D, E, F, G, H, I , &c. may be continued through any number of revolutions; a curve being drawn through all the points will give the spiral required.

Scholium.—As the tracing of the curve depends very much on the eye of the person who performs this operation, by the following method a curve may be drawn with a pair of compasses, provided that the points do not approach very rapidly to the centre. To describe any quadrant, take the length of the radius that bisects it from one extremity of the curve, describe an arc, and with the same radius from the other extremity describe another arc cutting the former; then from the point of intersection with the same distance, describe an arc between the two extremities, and it will pass through the middle point very nearly; thus, take the distance ZB as a radius; from the extremity A of the arc ABC describe an arc near the centre; from the point C , with the same radius, describe another arc, cutting the former near the said centre Z ; then from the point of intersection describe the arc AC , and the arc thus described will pass through the point B very nearly. In the same manner the successive arcs CE, EG, GI , &c. may be described. The curve thus formed will be so near as not to be detected by the eye.

PROB. XVIII.

To draw the representation of the meridians of a solid of revolution upon a plane parallel to the axis of the solid, given an axial section, that is a section of the solid passing along the axis upon a plane parallel to the said axis.

Let $abcdevkjihgf$, (*fig. 18.*) be the axial section, and qv the axis itself, af the base perpendicular to qv ; in qv take any number of points r, s, t, u ; through these draw bb, ci, dj , and ek , meeting the curve on the one side at b, c, d, e , and on the other at h, i, j , then it is obvious that the lines bb, ci, dj, ek , will be bisected; now, supposing the meridians to be formed on the surface of the solid by the intersections of five planes at equal angles round the axis, and that one of these planes is parallel to the plane of projection, and let $avfa$ be the representation of that plane; draw AB parallel to af ; produce vq to meet AB at w ; from w as a centre, with the radius qA or qf , describe the semicircle $A1234B$; divide the semicircle into five equal parts by the points of section $1, 2, 3, 4$; draw $3x$ and $4y$ perpendicular to AB , cutting AB at x and y ; make ql equal to wy . Set the proportional compasses in the ratio of qa to ql ; take the distance rb with the longer legs, and with the opposite legs set off the distance rm ; then take the distance sc with the longer legs, and with the opposite points set off the distance sn ; then take the distance td with the longer legs, and with the shorter legs set off the distance to ; lastly, take the distance ue with the longer legs, and with the shorter legs set off the distance up ; then draw the curve $Imnopv$, which will be one of the meridians as required. In the same manner, all the others may be found.

Besides the uses of the proportional compasses, which have already been shewn, they may be applied to trigonometry in finding the sides and angles of triangles; suppose in a right-angled triangle, that the two legs were given to find the angles; the analogy is, as the one side is to the other side, so is radius to the tangent of the angle opposite the latter side; set the proportional compasses in the ratio of the two sides containing the right angle; then the index will shew the tangent of the angle on the line of tangents.

Again, suppose the hypotenuse and one of the legs were given to find the angles, the analogy in this will be, as the hypotenuse is to the given leg, so is radius to the

sine of the angle opposite to that leg; set the proportional compasses in the ratio of the hypotenuse to the given leg, and the index will be against the sine of the angle.

Lastly, suppose the angles and the hypotenuse to be given, the method of proceeding in this case is exactly the reverse of the last; thus, set the proportional compasses to the sine of the angle, then extend the longer legs to the hypotenuse of the angle, and the shorter legs contain the length of the leg required.

In the same manner, if the angles and one of the legs were given to find the other leg, set the proportional compasses to the tangent of the leg required, then take the length of the given leg with the longer legs, and the distance between the points of the shorter legs will be the leg of the triangle, as required.

PROPORTIONAL Part. See PART.

PROPORTIONAL Scales, called also *logarithmical scales*, are the artificial numbers or logarithms, placed on lines, for the ease and advantage of multiplying, dividing, &c. by means of compasses, or of sliding rules.

They are, in effect, only so many lines of numbers, as they are called by Gunter, but made single, double, triple, or quadruple; beyond which they seldom go. See GUNTER'S Scale, SCALE, &c.

PROPORTIONAL Spirals. See SPIRAL.

PROPORTIONALITY, a term used by Gregory de St. Vincent, for the proportion that subsists between the exponents of four ratios.

PROPURTUM, or PURPORT, in our *Law Books*, the intention or meaning of any thing. "Secundum propurtum dicti chirographi, inter eos confecti."

PROPOSITION, PROPOSITIO, in *Logic*, part of an argument, in which some quality, either negative or positive, is attributed to a subject.

Chauvin defines proposition, a complete, consistent sentence, indicating or expressing something either true or false, without ambiguity: as *Xantippe is a bad wife. If an ass fly, he must have wings.*

Others, more philosophically, define proposition, a speech uttered or produced, to signify some judgment of the mind. Or, again, a proposition may be defined, a sentence in which two or more ideas or terms are joined and disjoined by one affirmation or negation.

A proposition consists of two terms; the one, that of which we affirm or deny, called the *subject*; the other, the thing affirmed or denied, called the *attribute*, or *predicate*. These two are either joined, or separated, by the intervention of some copula or disjunctive.

Thus in the proposition, *God is just*; the subject, *God*, is joined with the attribute, *just*, by the verb substantive, *is*. The schoolmen call the two terms the *matter*, and the copula the *form* of the proposition.

Now, as terms may be either singular, or common and universal, if the subject of a proposition be a common term, taken in all its extent, the proposition is called *universal*: as, *every atheist is blind.*

This is called a division according to the *subject*, or a division arising from the *quantity*.

If the common term be only taken in an indeterminate part of its extent, the proposition is called *particular*: as, *some atheists are wicked.*

If the subject of the proposition be singular, the proposition is called *singular*: as, *George is king of England.*

If no note, either of universality or particularity, be prefixed to a subject, in its own nature general, the proposition is *indefinite*: as, *angels are noble creatures.*

Those propositions which have only one subject, and one predicate,

predicate, are called *single*. And these are again either *simple* or *complex*: a *purely simple* proposition is that whose subject and predicate are made up of single terms, but if either or both be made up of complex terms, the propositions are called *complex*; which see. Those that have several subjects or predicates, are called *compound*: each proposition of this kind contains in it two or more propositions, which are either plainly expressed, or concealed and implied. The former sort are distinguished into six kinds, *viz. copulative, disjunctive, conditional, causal*, where two propositions are joined by causal particles, *relative* and *discretive*. The latter sort comprehend *exclusives, exceptives, comparatives*, as, *pain is the greatest affliction; inceptives*, and *desitives*, which relate to the beginning or ending of any thing, and *continuatives*, as, *Rome remains to this day*.

Some writers add under this class of propositions, another division of them into *direct* and *indirect*. A *direct* proposition is that in which a higher or more general thing is predicated of a lower and more particular: as, *man is an animal*. Others will have it, that in which the subject stands as a matter receiving, and the predicate as a form received: as, *Peter is learned*. An *indirect* proposition, according to some, is that in which an inferior is predicated of an higher: as, *an animal is man*. According to others, it is that in which the subject stands as the form, and the predicate as the matter: as, *every rational is man*.

Propositions considered with regard to their *form* or *copula*, or according to their *quality*, are divided into *affirmative* and *negative*. An *affirmative* proposition is when the idea of the predicate is supposed to agree to the idea of the subject, and is joined to it by the word *is* or *are*, as, *God is a spirit*. A *negative* proposition is when the predicate is not supposed to agree with the subject, and is disjoined from it by the particles *is not, are not, &c.* as, *Man is not innocent*.

There is another division of propositions among scholastic writers, into *pure* and *modal*; which may be called a division according to the *predicate*. Propositions are said to be *pure*, when they imply or involve nothing besides their matter and form, or when they merely express that the predicate is connected with the subject: as, *Man is rational*. A *modal* proposition is that which, beside the pure matter and form, involves some mode, or manner of connection between the predicate and the subject: as, *it is necessary man be rational*. Hence such a proposition is said to consist of a mode and a diction; the mode denotes some circumstance which affects the proposition; as, *it is necessary*: the diction is the rest of the proposition, *that man be rational*.

There are four of these modes very famous; *viz. necessary, possible, impossible, and contingent*. Others produce other modes; as, *true, false, certain, uncertain, probable, &c.*

To modal propositions, some philosophers refer *exclusive, exceptive, and restrictive* propositions; all which are denoted by a common name, *exponible* propositions, because requiring some explanation to make them clearly understood.

Propositions, according to their sense or signification, are distributed into *true* and *false*. A *true* proposition represents things as they are in themselves, or joins those ideas and terms together, whose objects are joined and agree; or disjoins those ideas and terms, whose objects disagree or are disjoined; as, *every bird has wings; a brute is not immortal*. A *false* proposition is that which represents things otherwise than they are in themselves, or joins those ideas or terms whose objects disagree, or disjoins those whose objects agree; as, *birds have no wings; brutes are immortal*.

Propositions according to their *different degrees of evidence*, are distinguished into *certain* and *dubious*. A *certain* propo-

sition is that where the evidence of the agreement or disagreement of the ideas is so strong and plain, that we cannot withhold nor delay our assent; which assent is distinguished by the name of *knowledge*; which see. (See CERTITUDE and EVIDENCE.) A *dubious* or *uncertain* proposition is where there is any obscurity upon the agreement or disagreement of the ideas, so that the mind does not clearly perceive it, and is not compelled to assent or dissent; such uncertain propositions are called *opinions*. See on this subject, Watts's excellent Introduction to Logic, part ii. chap. 1. and 2.

A syllogism consists of three propositions, major, minor, and conclusion. An enthymeme, of two.

The schoolmen make several other species and divisions of propositions, as, a proposition *de primo adjacente*, where the subject and predicate are both included under the verb: such are, *veni, vidi, vici*. Proposition *de secundo adjacente* is, where either the subject or predicate is included in the verb; as *I love, or I write*. Proposition *de tertio adjacente* is, where both the subject and predicate are expressed, and stand distinct from the verb: as, *the king is just*. This proposition is the rule or standard of all the others; so that whatever proposition can be reduced to it, is legitimate; and what cannot, is not.

PROPOSITIONS, *Contradictory, Contrary, Reduplicative*. See the adjectives.

PROPOSITIONS, *Conversion, Opposition, and Reduction of*. See CONVERSION, &c.

PROPOSITION, in *Mathematics*, is either some truth advanced and shewn to be such by demonstration; or some operation proposed, and its solution shewn.

If the proposition be deduced from several theoretical definitions compared together, as this: a parallelogram is double of a triangle, standing on the same base, and of the same altitude; it is called a *theorem*.

If it be deduced from a praxis or series of operations, it is called a *problem*; as to find a third proportional to two given quantities.

Indeed, in strictness, the proposition is only part of a theorem; *viz.* that which shews what agrees to such a thing under such conditions, and what not: in which sense it is distinguished from the *demonstration*, which shews the reason why the understanding conceives that to agree to it.

Again, strictly speaking, the proposition is only a member of a problem, *viz.* that which shews what is required to be done; in which sense it is distinguished from the *solution*, which rehearses the several things to be done in order to effect what is required; and from the *demonstration*, which proves, that by doing the things enjoined in the solution, the thing required in the proposition is truly done.

PROPOSITION, in *Poetry*, denotes the first part of an epic poem, in which the author proposes, or lays down, briefly and in general, what he has to say in the course of his work.

The proposition, F. Bossu observes, is to contain the bare matter of the poem, *i. e.* the action, and the persons that are to execute it, both human and divine.

This is what we have in the Iliad, the Odyssey, and the Æneid. The action proposed in the Iliad, is the wrath of Achilles; that of the Odyssey, the return of Ulysses; and that of the Æneid, the translation of the Trojan empire into Italy.

The same author observes, that the divine persons are named in all three propositions. Homer, *e. gr.* declares, that what happens in the Iliad, is by the will of Jupiter; and that Apollo was the cause of the quarrel between Agamemnon and Achilles: the same poet says, it was

Apollo prevented the return of Ulysses's companions; and Virgil mentions the Destinies, the will of the gods, and the anger of Juno. But they all three dwell chiefly on the person of the hero, as if he were the matter of the poem.

Yet there is some difference, in this respect, in the three poems; in that Achilles is named in the Iliad; but Ulysses and Æneas are not: they are only pointed at, and that in such general terms, as if it were supposed they were known before.

This practice seems to fall in with the first intention of the poet; who is to feign an action without names, and who, as Aristotle says, does not relate the action of Achilles, nor Ulysses, nor Æneas, nor any particular person, but of an universal, general, and allegorical person.

Add to this, that the character which the poet is to give his hero, and his whole work, is expressed in the proposition, both by Homer and Virgil.

The whole Iliad is anger and violence: it is Achilles's character, and it is what the poem commences with: *Μηδὴν αἰεὶ δεῖ*. The Odyssey presents us in the first verse with the prudence, dissimulation, and address, which make the character of Ulysses, and the business of the poem: *Ἀνδρῶν πολυτροπῶν*. And we see the piety and mildness of Æneas in the beginning of the Latin poem: "Insignem pietate virum."

As to the manner of the proposition, Horace contents himself to prescribe modesty and simplicity; not to promise much, nor raise great expectations in the reader. *Do not begin*, says he, *like that wretched poet, who set out with, Fortunam Priami cantabo, & nobile bellum. How much better is that of Homer, Dic mihi, Musa, virum? &c. He does not spend all his fire at once, and leave nothing but smoke: from this feeble beginning, you shall soon see him rise to the wonders of Antiphates, Scylla, Charybdis, and Polyphemus.*

The same modesty we find in the proposition of the Æneid: if that of the Iliad be a little more furious, it is, perhaps, in conformity to the character of the poem, which is a series of violences and extravagances.

Add, that if the poet be to speak with modesty of his hero, much more is he to do so of himself: thus Virgil only says, *I sing the action of Æneas*. Homer begs his Muse to *say*, or to *sing*. How far does Claudian swerve from these examples?

"—————Audaci promere cantu
Mens congesta jubet; gressus removete, profani:
Jam furor humanos nostro de pectore sensus
Expulit, & totum spirant præcordia Phœbum."

A short poem, *e. g.* an ode, &c. in which the violent strain could be pursued to the end, might admit of such a pompous beginning. Thus we find Horace begin an ode much after the manner of Claudian:

"Odi profanum vulgus, & arceo——
——Carmina non prius
Audita Musarum sacerdos
Virginibus puerisque canto."

But the length of an epic poem quite excludes all pompous propositions.

There is scarcely any fault we have yet observed a proposition liable to, but there is an instance of it in the proposition of Statius's Achilleid: he bids his *Muse rehearse the deeds of the magnanimous son of Æchus, who was formidable even to the Thunderer*. He adds, *That he has worthily discharged a*

former undertaking; and that Thebes esteems him a second Amphion.

"Magnanimum Æacidem, formidatamque Tonanti
Progeniem, & patrio vetitam succedere cœlo,
Diva, refer.——
Tu modo, si veteres digno delevimus haustu,
Da fontes mihi, Phœbe, novos, &c."

PROPOSITION, in *Rhetoric*, is that part of a just and regular discourse, in which the speaker lays down or proposes the subject upon which he designs to treat, in a distinct and express manner. This first employs his thoughts, though it usually follows both the introduction and narration in the order of the discourse. As the proposition is the basis of his whole design, it is necessary, in the first place, that this be duly weighed, and represented to his mind in all the different views, in which he can place it; that he well considers the nature of it, the several parts of which it consists, and the particular force of each part. By this means he will be the better enabled to offer such arguments, as may be proper, in its defence, and to refute any objections which may be brought against it.

Orators use several methods of laying down the subject of their discourses. Sometimes they do it in one general proposition. We have an instance of this in Cicero's speech to the senate, the day after Cæsar was killed, as it is given us by Dion Cassius, lib. xlv. p. 250. ed. Leunclav. in which his design was to persuade them to peace and unanimity. *This*, says he, *being the state of our affairs, I think it necessary that we lay aside all the discord and enmity which have been among us, and return again to our former peace and agreement*. And then he proceeds to offer his reasons for this advice.

At other times, in order to give a clearer and more distinct view of their discourse, they subjoin to the proposition, the general heads of the argument by which they endeavour to support it. This method Cicero uses in his seventh Philippic, cap. 3. where he says: *I, who have always commended and advised to peace, am against a peace with Mark Antony. But why am I averse to peace? Because it is base, because it is dangerous, and because it is impracticable; and I beseech you to hear me with your usual candour, while I make out these things*. See PARTITION.

But some orations, especially of the demonstrative kind, do not require any particular proposition, being little more than a continued narrative or illustration of the subject: of this sort is that of Cicero, in which he returns thanks to Cæsar, in the name of the senate, for pardoning Marcellus; and his invective against Piso: as likewise Pliny's panegyric in praise of the emperor Trajan. Not but that such discourses are disposed in a regular order, and under proper heads, though they are not laid down at first in distinct propositions.

Quintilian, Inst. Orat. lib. iv. cap. 5. observes, that orators sometimes avoid laying down any direct proposition, when the chief thing they have in view may be disagreeable to those whom they address; for which reason they take them off from attending to it, till they have first prepared them for it, by offering something else, which, when proved, the other may with less difficulty be admitted. Cicero makes use of this art in his defence of Ligarius. Ward's Or. vol. i. lect. 14.

PROPOWANG, in *Geography*, a town on the W. coast of the island of Celebes. N. lat. 1° 16'. E. long. 119° 13'.

PROPRÆFECT, PROPRÆFECTUS, among the Romans, the

the prefect's lieutenant; or an officer whom the prefect of the pretorium commissioned to do any part of his duty in his place.

In Gruter, p. cccclxx. the third inscription mentions prefects of the pretorium under Gratian, in the city of Rome, and the neighbouring parts.

PROPREMENT, Fr. Rousseau has given this word a place amongst French musical technica; which in the execution of vocal or instrumental music, seems equivalent to our words, *neat* and *clean*.

PROPRETE', Fr. *Neatness*, English. The same author defines the execution of French melody, with all its appropriate agréments, or graces, *propreté*, where it means propriety.

PROPRETOR, or PROPRAETOR, a Roman magistrate, who, having discharged the office of pretor at home, was sent into a province to command there with his former pretorial authority.

PROPRETOR was also an appellation given to those who, without having been pretors at Rome, were sent extraordinarily into the provinces, to administer justice with the authority of pretors.

PROPRETOR is also a denomination given by some to those sent by the emperors into the provinces, which, upon partition in Augustus's time, fell to their lot: as the name *proconsul* was given to those sent into the provinces that fell to the people's share.

PROPRIETARY *Governments in America*. See the account of *CHARTER Governments*.

PROPRIETARY *Monks*, were such as had reserved goods and effects to themselves, notwithstanding their formal renunciation of all at the time of their profession.

They are frequently mentioned in the *Monast. Anglic. &c.* and were to be very severely dealt with; to be excommunicated, deprived of burial, &c. "Monachi proprietarii excommunicentur ab abbatibus; & si in morte proprietarius inventus fuerit, ecclesiastica careat sepultura, &c." *Addit. ad Matt. Pat.*

PROPRIETATE PROBANDA, in *Law*, is a writ to the sheriff to inquire of the property of goods distrained, when a defendant claims a property upon a replevin sued.

Where a property is proved by the defendant, a replegiari properly lies not.

PROPRIETATIS ELIXIR. See *ELIXIR*.

PROPRIETOR, or PROPRIETARY, he who has the property or propriety of any thing.

PROPRIETOR, in *Law*, is strictly such a one as has, or possesses, any thing as his own in the utmost degree: "Quæ nullius arbitrio est obnoxia."

The term was formerly applied, in a particular manner, to him who had the fruits of a benefice to himself, and his successor; as in ancient time, abbots and priors had.

PROPRIETORS of *Land*, in *Agriculture*, such persons as hold landed property. It is observed by the author of the "Present State of Husbandry in Great Britain," that the lands in England and Wales were, at no very remote period, chiefly in the possession of the crown, the church, and great proprietors; but that, owing to several causes, noticed below, landed property has become of late more widely diffused, and new orders of proprietors have risen into consequence, which has proved greatly advantageous to the state, not only in regard to improvements in husbandry, but also to the advancement of all the other arts.

The extent of landed property formerly vested in the crown, was very considerable; but during several reigns many improvident grants were made to particular favourites, whereby it became much diminished. From the report

given into parliament some years ago by the commissioners appointed to inquire into the landed revenues of the crown, it appears that the old and improved rent then payable, amounted only to 16,784*l.* 12*s.* 3¼*d.* The real annual value, however, far exceeds this sum; for, in the same account, it is stated, that the lands and estates from which the above-mentioned rent is payable, were, by the latest surveys, ascertained to be worth 102,626*l.* 14*s.* 1½*d.* *per annum*. The writer, however, disclaims any intention of throwing out the most distant personal reflection to the prejudice of those in the management of the crown-lands. It is well known, that these estates are commonly let on leases of one, two, or three lives, or for a great number of years, on every renewal of which, fines (in Scotland called *grassums*) are exacted. These fines, paid at the commencement of the leases, and improved by compound interest during the currency of them, may perhaps in the end exceed, in some cases, any yearly additional rent that could be demanded.

It is supposed that it is impossible to form any correct idea of the lands now in possession of the church. They are commonly let on leases of twenty-one years, renewable every seven, on payment of a fine; and therefore the rent-roll must be rather nominal, than such as can convey any information in regard to the real annual value of the property. Suppose the clergy of England had a right to the tythes over the whole kingdom; that all the parishes were inclosed; and that an allotment of land was given in every case, in lieu of tythes, a judgment might be formed of the extent of land that would fall to be possessed by them, from the rule frequently adopted by those who act as commissioners under acts of parliament past for inclosing certain parishes, namely, giving the clergymen one-sixth of the arable, and one-ninth of the pasture, or two-thirteenths of the whole. Including the lands in the possession of the religious corporations, it is probable they might amount to nearly one-fifth of the whole kingdom.

And it has been observed, that while the feudal system existed, the lords and great proprietors parcelled out considerable parts of their estates among their vassals and dependents. Since the abolition of that system, the possessors of these lands have been generally known by the name of yeomen; a most useful and valuable class of men, who are at present proprietors of no inconsiderable share of the landed property of England. And the recent very great increase in trade and manufactures, and the consequent influx of money, have tended still more to the division of property, by the creation of a great number of small freeholds. Proprietors of extensive manors, who find it necessary to dispose of their estates, (and this will happen in every country where the practice of entailing landed property does not prevail,) judged it for their interest to parcel them out in small lots, rather than sell them in entire manors. This having been for years the general practice, especially when the estates were situated in the vicinity of great cities, or large manufacturing towns, merchants, and manufacturers, and the officers of our fleets and armies, have had opportunities of exercising that degree of genius and persevering industry in planning and executing agricultural improvements, which in the early part of life enabled them to lay the foundation for becoming proprietors. It is, therefore, concluded that the proprietors of England and Wales may be classed into two divisions. The crown, the religious corporations, or clergy, and the great landholders, or those who possess from 5000*l.* to 50,000*l.* a-year and upwards, form the first class; and probably possess nearly three-fifths of the whole. The second division, consisting of that great body of gentlemen, holding

PROPRIETORS.

ing estates from 400*l.* or 600*l.* to 4000*l.* or 5000*l.* a-year; and the yeomanry, or those who possess from 30*l.* or 40*l.* to 500*l.* or 600*l.* of yearly rent; who are in possession of the remainder. These divisions have been much extended in the course of the last half century, and are still extending very rapidly.

In Scotland, however, the writer remarks, the crown can hardly be said to possess any landed property. But it is only a few years since that was the case; for, in consequence of the rebellions which happened in the years 1715 and 1745, the estates of several noble and respectable families were forfeited and annexed to the crown, on account of the active concern which the then proprietors took in those rebellions, in opposition to the established government. Highly to the honour of the British legislature, however, such of these estates as were unfold and annexed to the crown, were lately restored to the representatives of those families by act of parliament; an act which experience has already proved was politically right; as almost all the proprietors of those estates are now evincing their gratitude to their king and country, by exerting their utmost endeavours in the defence of both.

But here, previous to the abolition of popery in the year 1560, the clergy possessed landed property to a very great extent, but at that period the great proprietors who had (with a view to promote their own interests) encouraged and supported the promoters of the Reformation, when it was effected, seized on all the church lands, and in lieu thereof, and of the tythes which were formerly payable, allotted a certain quantity of money, or grain, or both, with a house, and a few acres of land, for the support and accommodation of each Protestant clergyman. As proprietors, therefore, this respectable, useful, well-informed, and deserving body, amounting to upwards of 900, rank very low, in comparison of what their predecessors did; for, in consequence of their offices, they only possess about 6000 acres of arable land. In this part of the kingdom, the feudal system was not only carried to a greater extent, but continued much longer in force than it did in England; and as manufactures and commerce began to flourish here only since the middle of the last century, a greater proportion of the landed property still remains in the hands of great proprietors, especially in the northern and more remote districts, where trade and manufactures are comparatively but little known. In Scotland, great proprietors alone, or those holding estates from 4000*l.* or 5000*l.* to 25,000*l.* a-year and upwards, may be said to be invested with the one-half of the whole kingdom. The other half is more generally divided; the greatest part of it being possessed by a numerous and respectable body of gentlemen in estates varying from 300*l.* or 400*l.* to 4000*l.* or 5000*l.* a-year, and the remainder by such as possess from 30*l.* or 40*l.* to 300*l.* or 400*l.* of yearly rent. There are not many of this last description, who, like the English yeomen, cultivate their own estates; being for the most part engaged in the naval, military, or civil departments of the state, few of them reside constantly in the country.

Mr. Marshall has remarked, in his work on landed property, in speaking of the management of estates, that the principal objects to be regarded are tenanted farms, and their inhabitants, whether occupiers or labourers. And that the others are woodlands; which are now generally, and properly, kept distinct from tenanted farms; excepting such plots as are requisite to the due occupancy of the farm lands. Also the waters and quarries that are not let with the tenanted lands; and mines, whether in hand or tenanted: together with the abstract rights attached to an estate; as tithes, manorial rights, chief rents, &c. &c.

And, lastly, demefne lands, whether they are kept in hand, for domestic purposes, or as a seminary of improvements for the use of the estate. The importance of which are, he thinks, obvious, for, says he, it were folly to purchase an estate, and equally imprudent to improve one, unless to be afterward duly managed; so as to secure a profitable return for the money laid out. But that, beside the profits which issue from landed property, there are other considerations which the proprietor of a tenanted estate cannot overlook. He differs essentially from the possessor of ordinary property. He is not in possession of the lands only, but also of their inhabitants. For, although in England tenantry are not bought and sold, as other live stock; yet when an estate is under lease, tenants may be said to be as firmly rooted in the soil as the oaks are which grow upon it. And even where tenants are at will, and labourers without certainty, such are, in general, their attachments to their native soil, and their natural connections, that to be driven from them is banishment:—a patriot prejudice, which is planted in human nature, and which ought at all times, and especially at present, to be kindly cherished. And in this country the possessor of an extent of territory has infinitely more power over its inhabitants than government itself. He may not only banish the native inhabitants, but he may depopulate the country, or may increase its population, as to his pleasure may seem meet. By changing the inhabitants, he may change the manners of a country, as from vice to virtue, or the reverse; and has it thus in his power to render the little world around him, as well as himself, miserable or happy; according to the principles of management he pursues. What inducements these are to men of fortune, to bend their minds cheerfully to their territorial concerns, and improve them in the best and most advantageous manner. See TENANT, and FARM.

However, though the promotion of such improvements be obviously of the greatest consequence and advantage to such proprietors as well as the public, they are in many cases strangely neglected, and even in some discountenanced. It has, indeed, been observed in a paper in a useful periodical work, the writer of which, after stating that the situation is highly favourable, the tenantry, eager to improve their farms, knowledge disseminated, and capital accumulated, that strange as it may appear, many very considerable land owners rather betray a disposition to retard, than to expedite real improvements. The terms of the leases are often arbitrary, and the landlord is too often reluctant in contributing a reasonable proportion towards permanent improvements, which are in themselves absolutely necessary, and of which it is equally preposterous and unjust to exact or expect the execution totally at the tenant's expence, more especially as the usual duration of his lease is seldom adequate to indemnify him. Even some proprietors do not only contribute reluctantly, but nearly refuse every assistance upon any terms. They accept the highest offer for the naked farm, and provided the stipulated rent be regularly paid, they appear indifferent how the tenant accommodates himself. They, indeed, express wishes to see their lands improved, but the honour of their motives may be doubted. Straightened circumstances do not by any means seem to form an excuse for this backwardness. It perhaps ought to be attributed to jealousy against their inferiors, and a desire of immediate aggrandisement, by pocketing an additional income without deduction. Such reasons as these are, however, entitled to no merit. But he does not intend to throw out reflections on all the land owners in his part of the country; for if some of them had not adopted a more liberal way of proceeding, agriculture would never have made the progress
amongst

amongst us which it has already done; at present, it would, however, be easy to prove that the landlords are, upon the whole, more backward than the tenantry. Many do not choose to become converts to their real interests, or to the lasting good of their country, but prefer a continuance of their illiberal policy of laying hold of what they can at the time, and allowing futurity to shift for itself. Under such a system, the tenant must be a drudge: his mind, broken down by his situation, disqualifies him for exertion, even though the necessary means were to come into his possession. His family, rudely educated, are only fit for labourers or low mechanics; and one great link of the chain which connects an enlightened society is thus rejected or destroyed.

It is the advice of Mr. Middleton, that every proprietor of a large landed estate should occupy one of his own farms, which, by being cultivated on the most improved scientific principles, may teach the neighbouring tenantry the best practice, by the most powerful of all means, that of *example*. If this, which seems to be at present more attended to, was general, much advantage no doubt would be the consequence of the proceeding.

PROPRIETY, in *Grammar*, is where the direct and immediate signification of a word agrees to the thing it is applied to.

In which sense propriety is used in opposition to a figurative or remote signification. Propriety of language denotes the selection of such words as the best usage has appropriated to those ideas, which we intend to express by them; in opposition to low expressions, and to words and phrases which would be less significant of the ideas that we mean to convey. To preserve propriety in our words and phrases, we must avoid low expressions; supply words that are wanting; take care not to use the same word in different senses; avoid the injudicious use of technical phrases, equivocal or ambiguous words, unintelligible expressions, and all such words and phrases as are not adapted to our meaning. See Murray's Eng. Gram. vol. i. p. 411, &c.

PROPTOMA, or PROPTOSIS, from προπτω, to fall out, in *Surgery*, a falling down, or displacement, of any part of the body.

PROPYLÆUM, Προπυλαίων, the porch of a temple, or great hall. See ATHENS.

Hence propylæum is also used figuratively, in matters of learning, for an introduction, apparatus, or prodromus, to some greater work. In this sense, we say, the propylæum of the Jesuits at Antwerp, &c.

PROQUESTOR, PROQUÆSTOR, the questor's lieutenant, or a person who discharged the office of questor in his stead, without the deputation of the senate.

The word is chiefly applied to an officer appointed by the governor of a province to discharge the questure after the decease of the questor, or when he went to Rome without being succeeded by another questor, till the senate and people should send a new one.

PRORÆ OS, in *Anatomy*, a bone of the cranium, called also os occipitis.

PRO RATA, in *Commerce*, a term sometimes used among merchants, for in proportion.

Thus, when speaking of any undertaking, they say, each person must reap the profit, or sustain the loss, *pro rata* to his interest; it is meant, each shall gain or lose, in proportion to the sum he put in stock.

PRO RATA Portionis, in *Law*. See ONERANDO *pro rata portionis*.

PROROGANDA ASSISA. See ASSISA.

PROROGATION, PROROGATIO, the act of prolonging, adjourning, or putting off, to another time.

PROROGATION of Parliament. See PARLIAMENT.

The proroguing of the lower house of convocation is a power vested in the archbishop with the consent of the suffragans.

PROSAIC NUMBERS. See NUMBERS.

PROSASCO, in *Geography*, a town of Italy, in the Friuli; eight miles N. of Friuli.

PROSCARABÆUS, in *Zoology*, the name by which some call the *meloe*, a genus of four-winged flies. See OIL BEETLE.

PROSCENIUM, in the *Ancient Theatre*, was an eminence on which the actors performed their parts.

The proscenium answered to our stage. It consisted of two parts among the Greeks; one particularly so called, where the actors performed; the other was the *logeion*, where the singers and the mimics acted their parts. Among the Romans, the proscenium and pulpitum were the same thing.

PROSCHÆRETERIA, Προσχαιρέτρια, in *Antiquity*, a day of rejoicing, kept when a new-married wife went to cohabit with her husband.

PROSCHEWA, in *Geography*, a town of Prussia, in the palatinate of Culm; 18 miles N.E. of Thorn.

PROSCHOWITZ, a town of Austrian Poland; 55 miles E.N.E. of Cracow.

PROSCLYSMA, a word used to express an irroration, or sprinkling of any part with a fluid, as the throwing water in the face in cases of fainting, &c.

PROSCRIPTION, PROSCRIPTIO, a publication made in the name of the chief or leader of a party, by which he promises a reward to any one who shall bring him the head of one of his enemies.

Sylla and Marius, by turns, proscribed each other's adherents. Under the triumvirate, a great part of the best and bravest of the Romans fell by proscription.

The term took its rise from the practice of writing down a list of the person's names, and posting it in public; from *pro*, and *scribo*, I write.

PROSDOCEMUS DE BELDEMANDIS, in *Biography*, was one of the earliest writers on music, at the beginning of counterpoint. Among the Vatican MSS. there is a treatise on music in parts or counterpoint, by an Italian of this name, written in 1412. It is chiefly an exposition and commentary of the doctrines contained in the "Practica Mensurabilis" of John de Muris, in his "Speculum Musicæ." Padre Martini was in possession of the tract of John de Muris, under the title of "Practica Mensurabilis Cantas: Mag. Joan. de Muris, di Normandia, alias Parisiensis, cum expositio Prosdocemi de Beldemandis patav. MS. an. 1404."

PROSE, PROSA, the natural language of mankind, loose, and unconfined by poetical measures, rhymes, &c. In which sense it stands opposed to *verse*.

The word comes from the Latin *prosa*, which some will have derived from the Hebrew *paras*, which signifies *expedit*; others deduce it from the Latin *prorsus*, or *prorsus*, going forwards; by way of opposition to *versa*, or turning backwards; as is necessary in writing verse.

Though prose hath its connexions, which sustain it, and a structure which renders it numerous, it ought still to appear free: its character consists in running easy, and unrestrained.

Poets very rarely have the talent of prose; the habit of wearing chains fits fast upon them, even when the chains are off.

St. Evremond compares prose writers to foot-travellers, who walk with less noise, but more security, than the cavaliers.

PROSECKEN, in *Geography*, a town of the duchy of Magdeburg; seven miles N. of Wismar.

PROSECUTION. To make men liable to criminal prosecutions

prosecutions by the law of England, it is required that they have the use of reason, and that they be *sui juris*. On the first account the law indulges infants under the age of discretion, ideots, and lunatics, whatever the nature of the fact may be; and even against the person of the king, as it has been held of late; neither will it suffer one who becomes *non compos* after he has committed a capital offence, to be either arraigned or executed. See LUNATIC, and INFANT.

As to an offender's being *sui juris*, it is to be observed, that neither a son, nor a servant, nor any other person, except a feme covert, is excused on the account of acting by command or coercion of another. See FEME COVERT.

The prosecution in the process towards the punishment of offenders succeeds their commitment, and denotes the manner of their formal accusation. This is either upon a previous finding of the fact by an inquest, or grand jury, or without such previous finding. The former mode is either by *presentment*, or *indictment*, which see. The other methods of prosecution are without any previous finding by a jury, to fix the authoritative stamp of verisimilitude upon the accusation. One of these, by the common law, was when a thief was taken *with the mainour*. (See MAINOUR.) This was taken away by several statutes; so that the only species of proceeding at the suit of the king, without a previous indictment or presentment by a grand jury now seems to be that of *information*, which see. There is another method of prosecution, at the suit of the subject, called an *appel*, which see.

PROSECUTION of Felons. See LARCENY and REWARDS.

PROSECUTOR, in Law, is he that pursues a cause in another's name.

In criminal proceedings, or prosecutions for offences, the king is prosecutor. All offences are either against the king's peace, or his crown and dignity; and are so laid in every indictment. For though in their consequences they generally seem (except in the case of treason and a very few others) to be rather offences against the kingdom than the king; yet, as the public, which is an invisible body, has delegated all its powers and rights, with regard to the execution of the laws, to one visible magistrate, all affronts to that power, and breaches of those rights, are immediately offences against him, to whom they are so delegated by the public. He is therefore the proper person to prosecute for all public offences and breaches of the peace, being the person injured in the eye of the law. See KING and PREROGATIVE.

PROSEG, or PROSECO, in Geography, a town of Istria, celebrated so long ago as the time of Augustus for its wine, so that his wife Livia used it as a cordial in her old age; its qualities are described by Pliny. The ancient name of this town was "Pencinum;" seven miles N.W. of Trieste.

PROSELYTE, PROSELYTUS, a new convert to the faith.

The word is Greek, *προσηλυτος*, which, in Latin, signifies *advēna*; in English, *stranger*, or one arrived out of another country.

The term was much used in the primitive church. The Jews too had their proselytes, who, from being Gentiles, embraced Judaism; either wholly, or in part.

Among the Hebrews there were two sorts of proselytes; one called *proselytes of righteousness*, or *proselytes of the covenant*, who became complete Jews, by submitting to the rite of circumcision, and were in all respects united to the Jewish church and nation: they were denominated proselytes of the covenant, because they were received into the covenant of God by circumcision, which was named the blood of the covenant, because, according to St. Paul (Gal. v. 3.) men were bound by it to observe the ceremonial law; and they

were called proselytes of righteousness, on account of their acknowledging and observing the whole ceremonial law, to which the Jews, and the Pharisees in particular, attributed their being accounted righteous before God. At their admission there were three ceremonies performed, *viz.* circumcision, baptism, and a sacrifice, generally consisting of two turtle doves and two young pigeons. After these ceremonies the proselyte received a new name, and no longer owned any relations in the world. See John, iii. 3. Luke, xiv. 21. 2 Cor. v. 16, 17. 1 Pet. ii. 2.

It is said in the Talmudical writings, that though they were regarded as Jews, they were admitted to no office, and were treated with great contempt.

The latter were called *proselytes of the gate*, who did not embrace the Jewish religion, so as to be obliged to receive or observe the ceremonial law, and yet were suffered to live among the Jews under certain restrictions; as that they should not practise idolatry, nor worship any other god beside the God of Israel; that they should not blaspheme the God of Israel; that they should keep the Jewish sabbath, so far at least as to refrain from working on that day. Besides forsaking idolatry, they were under an obligation to observe the seven precepts, which, as the Talmudists pretend, God gave to Adam and afterwards to Noah, who transmitted them to posterity. The first of these precepts forbids idolatry, and the worship of the stars in particular; the second recommends the fear of God; the third forbids murder; the fourth adultery; the fifth theft; the sixth enjoins respect and veneration for magistrates; and the seventh condemns eating of flesh with the blood. This last, as the Rabbins say, was added after God had permitted Noah to eat the flesh of animals. No ceremony was performed at the admission of these proselytes. Maimonides expressly says, that they were not baptized. These strangers were permitted to worship the God of Israel in the outer court of the temple, which, for that reason, was called the court of the Gentiles.

Dr. Lardner, with whom Dr. Doddridge and others also agree, is of opinion that there was but one sort of proselytes among the Jews. They were circumcised, and thus they became Jews by religion, and were admitted to eat the passover, and to partake of all religious privileges, as the Jews by descent did. They were called "strangers, or proselytes within the gates, and sojourners," as they were allowed to dwell, or sojourn among the people of Israel. And they were so called, because they could not possess land. For according to the law of Moses, the whole land of Canaan was to be given to the 12 tribes of Israel, the descendants of the patriarch Jacob. (See Exod. xii. 48. 49. Lev. xvii. 8. 13. 15. Numb. ix. 14. xv. 15.) A proselyte was a man circumcised according to the law of Moses, or a Jew by religion. This is the sense of the word in all the texts of the New Testament where it is used. (Matt. xxiii. 15. Acts, ii. 10. vi. 5. xiii. 43.) Dr. Lardner thinks that the notion of two sorts of Jewish proselytes cannot be found in any Christian writer before the 14th century or later. Cornelius is not called a proselyte in the New Testament. This learned writer pays no regard to what the later Jewish Rabbins say of the method of initiating proselytes by circumcision, baptism, and sacrifice. See Lardner's Works, vols. vi. and xi. Doddridge on the Acts.

PROSELZHEIM, or BROSSELSHEIM, in Geography, a town of the duchy of Wurzburg; seven miles N.E. of Wurzburg.

PROSENDORF, a town of Bavaria; five miles N.N.E. of Bamberg.

PROSERPINA, in Botany, a name given by some authors to chamomile.

PROSER-

PROSERPINACA, said by Linnæus to be derived à *proserpendo*, from its creeping. It is also, according to Martyn, an ancient name in Apuleius, and Pliny has a genus called *Proserpina*, from the queen of the infernal regions. Gronovius seems to have chosen the name for the present plant, because it grows in low places infested by frogs and newts.—Linn. Gen. 41. Schreb. 56. App. 818. Willd. Sp. Pl. v. 1. 488. Mart. Mill. Dict. v. 3. Pursh. v. 1. 28. Michaux. Boreal-Amer. v. 1. 76. Juss. 68. Lamarck Illustr. t. 50. (Trixis; Mitch. 23. Lamarck. Dict. v. 8. 117. Gærtn. t. 24.)—Class and order, *Triandria Trigynia*. Nat. Ord. *Inundate*, Linn. *Hydrocharides*, Juss.

Gen. Ch. Cal. Perianth superior, of three erect, acute, permanent leaves. Cor. none. Stam. Filaments three, awl-shaped, spreading, the length of the calyx: anthers twin, oblong, acute. Pist. Germen inferior, triangular, very large; style none; stigmas three, downy, thickish, the length of the stamens. Peric. Drupa small, dry, ovate, triangular, three-winged, crowned by the permanent, closed calyx. Seed. Nut rather bony, triangular, three-celled; kernels oblong, affixed to a thread.

Ess. Ch. Calyx superior, three-cleft. Corolla none. Nut inferior, three-celled.

1. *P. palustris*. Linn. Sp. Pl. 129. Act. Ups. for 1741. 81. (Trixis palustris; Gærtn. t. 24. f. 8.)—Leaves linear-lanceolate, serrated, the bottom ones pinnatifid.—Native of ditches and pools between Canada and Carolina, flowering in July.—Root annual, creeping. Stems a foot high, roundish. Leaves alternate, stalked; lower ones immersed, pinnatifid, with linear segments. Flowers axillary, solitary. Nut whitish, with a pale reddish kernel. Linnæus says the fruit is like that of a *Polygonum*.

2. *P. pectinata*. Pursh. v. 1. 92. Lamarck Illustr. t. 50. f. 1.—Leaves all pinnatifid in a pectinate manner.—Found in overflowed places, and ditches, from New Jersey to Carolina, flowering in July and August.—Michaux considers this but as a variety of the last species, and calls it *P. palustris* β , but Pursh thinks it is certainly a distinct species. He never found the two growing promiscuously, or near one another. We adopt this entirely on the authority of the latter author, having never seen either a specimen, figure, or description.

PROSERPINE, in *Mythology*, the daughter of Jupiter and Ceres, wife of Pluto, stolen by him out of Sicily, and carried to his subterranean dominion, where she was the partner of his empire. The poets and painters represent her with a dark complexion, and a melancholy air in her face. Statius (Theb. 8. v. 11.) assigns her the employment of keeping a register of the dead, and marking down all that should be added to that number. He also says, (lib. 5. Sylv. 1. v. 257.) that when any woman dies who has been a remarkable good wife in this world, Proserpine prepares the spirits of the best women in the other to make a procession to welcome her into Elysium with joy, and to strew all the way with flowers where she is to pass. See CERES and COREIA.

PROSEUCHÆ, derived from *προσευχη*, *prayer*, or *oratories*, in *Antiquity*, were the places of prayer among the Jews, and nearly the same as their synagogues. But the synagogues were originally in the cities, and were covered places; whereas, for the most part, the proseuchæ were out of the cities, and upon the banks of rivers, having no covering, except, perhaps, the shade of some trees, or some covered galleries.

Dr. Prideaux mentions another distinction in respect to the service performed in them: in synagogues, he says, the prayers were offered up in public forms in common for the

whole congregation; but in the proseuchæ they prayed as in the temple, every one apart for himself. Conu. part 1. book 6. vol. ii. p. 556. &c. edit. 10.

After all, it remains a question with some whether the synagogues and the proseuchæ were any thing more than two different names for the same place; the one taken from the people's assembling in them, the other from the service to which they were more immediately appropriated, *viz.* prayer.

PROSKAU, or PRUSKAU, in *Geography*, a town of Silesia, in the principality of Oppeln; 6 miles S. of Oppeln. N. lat. 50° 31'. E. long. 17° 51'.

PROSKEN, a town of Prussia, situated on the Lick; 10 miles S.E. of Lick.

PROSLAMBANOMENOS, in the *Ancient Greek Music*, was the first note of their scale, whether ascending or descending.

It was usual among the Greeks to consider a descending as well as an ascending scale; the former proceeding from acute to grave, precisely by the same intervals as the latter did from grave to acute. The not distinguishing of these two scales has led several learned moderns to suppose, that the Greeks, in some centuries, took the proslambanomenos to be the lowest note in their system; and in other centuries to be the highest. But the truth of the matter is, that the proslambanomenos was the lowest or highest note, according as they considered the ascending or descending scale. The learned author of this remark, thinks this distinction of the ascending or descending scales conducive to the variety and perfection of melody: but he says, he never met with above one piece of music, where the composer appeared to have any intelligence of that kind; and this piece was above one hundred and fifty years old.

We wish the author had told us where this piece of one hundred and fifty years old was to be seen, and by whom it was composed: as we are not yet convinced of the Greeks having a *descending* as well as an *ascending* scale; though Dr. Pepusch asserts roundly, and without the least modification of doubt, or even condescending to allege a single reason or proof in defence of his opinion, that "it was usual among the Greeks to consider a descending as well as an ascending scale; the former proceeding from acute to grave, precisely by the same intervals as the latter did from grave to acute. The first found of each was the proslambanomenos." Phil. Trans. N° cccclxxxi. p. 226, and Martyn's Abridg. vol. x. part 1. p. 261.

No instances of these inverted scales are to be found, however, in Aristoxenus, Euclid, or any of the oldest and best writers. Boethius, Bryennius, and some other of the more modern compilers, have, indeed, puzzled the cause by ambiguous expressions, which seem to bear such construction. Meibom. in Gaudent. p. 33, et Wallis in Bryennio, p. 364, et seq.

It seems, however, as if all this doubt and perplexity had arisen from the want of precision in the musical nomenclature of the Greeks. The prepositions *ὑπο*, *sub*, *ὑπερ*, *super*, and the adjectives *ὑπάρτος*, *summus*, and *ὑπέρτος*, *imus*, have manifestly been applied to sounds more to express their situation in the lyre and diagrams, than the length of the strings, or the gravity and acuteness of their tones.

Dr. Wallis, in his Appendix to Ptolemy's Harmonics, explains this difficulty in the following manner.

"The Greeks called hypate, *supreme*, though it is the lowest sound or string of the tetrachord; and nete, *last*, or *lowest*, though the most acute. (This Henry Stephens acknowledges at the word *ἡπτε*, which he defines *ultimam seu imam*: and parnete, *ima proximam*): therefore those who

first made use of these names, applied them differently from us, calling grave, *high*, and acute, *low*. And thus Nicomachus, p. 6, calls Saturn, the highest of the planets, Hypate; and the moon, the lowest, with respect to us, Nete. Boethius, likewise, in his Treatise on Music, places, in all his diagrams, the low sounds at the top, and the high ones at the bottom. But, he concludes, that we must not attend to the original import of these words, *summus* and *imus*, but understand hypate and nete as *first* and *last*, or *principal* and *extreme*, as Aristides Quintilianus has done, p. 10."

In the first, or Mercurian lyre, the longest string, which produced the lowest sound, from being placed highest in the instrument, as is the case with the modern harp, was called hypate, the *highest* sound; and nete, for the same reason, was afterwards, upon the extension of the scale, called *lowest*, though the most acute. Trite, the third string from the top of the two last tetrachords, had its name, as in our violins, by comparison with the smallest strings. From a passage in Aristides Quintilianus, it seems as if the Greeks, in naming and numbering the notes of their scale, made it a rule always to go *towards* mese, and end with it, as being the regulator of the other notes, and situated in the *medium* of the voice. This is confirmed by the problem of Aristotle already cited, and this confirms what has been already observed of the order of the alphabetic notation, in which mese is always expressed by omega. It seems, therefore, as if the Greeks ascended the lower octave of the diatonic, and descended the upper one; otherwise it is not easy to see why the strings of the upper octave should have names referring, as they evidently do, to a descending series, in an order opposite to those of the lower octave.

Παρεα, in the compound names of the notes, evidently means *next in order*; parypate, in the lower octave, then is *ascend*; paranete, in the upper octave, plainly *descent*. The same is implied in trite. But the term nete, *last*, looks very like ascent again—*And darkness was upon the face of the deep!*—These contradictions may account in some degree for the great perplexity about the scale; they are curious however, and as well worth observing, perhaps, as any matters of this kind.

The proslambanomenos was one of those sounds which the ancients called *stables*, from their remaining fixed throughout all the genera and species.

For a farther account of the proslambanomenos, see GREEK Music.

PROSNITZ, or PROSTIAGOW, in *Geography*, a town of Moravia, in the circle of Olmutz; 8 miles S.S.W. of Olmutz. N. lat. 49° 35'. E. long. 17° 3'.

PROSODIA, Προσοδία, in *Antiquity*, a sacred song, or hymn sung in honour of the gods. It differed from the prosodia with an omega, προσωδία, which was a song sung in concert with some musical instrument.

PROSODIUM, προσωδιον, according to Jul. Pollux, was the name of a canticle in honour of Apollo, composed by Eumelus of Corinth, cited by Pausanias and Athenæus, as one of the most ancient musicians of Greece.

PROSODY. Though it has been observed that prosody, according to its derivative acceptation from προσωδία, chiefly signifies the accent of syllables, yet both in its generally received and enlarged sense, as well as from its derivation προς and ὤδη, it implies, as the sequel will exemplify, all that can affect articulated harmony, in verse or prose. It is common, therefore, to include under this term, *accent*, *emphasis*, *quantity*, *pause*, *tone*, and the laws of *versification*. Our remarks concerning the two former have been already given, as our readers will find, in the alphabetic series of this work; and on which we shall here offer nothing

more than what is required by a precise and accurate explanation of the third particular of this article, or

QUANTITY.—From the many that have written on this subject, and that have assigned, with such precision and care, rules to determine the quantity of the syllables composing the ancient languages, we might almost naturally infer, that what syllabic quantity actually was among the ancients, is, at this time, known amongst the moderns; but the case is otherwise. To determine whether a syllable is long or short, and to produce our rule from the grammarian or the poet, are by no means difficult; but to define what quantity was, in the age when its nature was not determinable from the mouldering manuscript, or the hieroglyphic symbols of our modern copyists; when the criteria for the ear, which Quintilian declares cannot be ocularly intimated, were obtained from the only legitimate and effectual source, the viva vox, is a task too arduous for us to undertake; at least at a time when the lip and the tongue, the sole proprietors of this faculty, are fallen into dust; and all that was once argumentative in the senate, eloquent in the forum, and harmonious on the stage, are now but silence and oblivion. From the ashes, however, we, together with every tribe of antiquarians, have gleaned our quota; and from the scattered fragments, the imperfect records, the broken monument, the sepulchral mansion, and the relics of the general ruin, have very shrewdly, in common with our sagacious brethren, collected, what we call, our rules, when, alas! they are but conjectures.

To obtain an adequate idea of the difficulties attending a just perception of the ancient elocution, we must recollect, that not only were there fifteen vowel sounds, represented by six letters, but each of these was again susceptible of one of the three accents, the acute, the grave, or the circumflex. And though the Greeks remedied this in part, by two additional characters, yet to express the mere duration of their syllables, there remains an obvious deficiency. Besides, every intelligent observer will admit, that elocution is nothing but a species of music, since every thing implied by the duration of a syllable, the mood or general time of delivery, accent, emphasis, pause, tone, and cadence, are properties which may be very adequately expressed on paper, in musical composition, or, more completely, by a good organ. The duration of a syllable is perfectly analogous to the relative difference between a minim and a crotchet; the mood, to the general time, whether quick or slow, observed in the whole composition; accent and emphasis, being an elevation or depression of the voice, are actually the variation from one note to another; pause is, by musicians, under the term a *rest*, only changed in name; tone, implying all that modulation of the voice effected by the tranquil, plaintive, or impassioned mind, is what the complete organ very nearly effects by the different tones termed the diatonic, semiquarter, principal, and, occasionally, by the swell; and the cadence is but the return of the air and notes to the same key to which the whole composition is set. Though these several properties are comprehended but seldom in the idea of all that is requisite to read an oration, or a poem, yet they do not exceed, but are really short of the qualities that constitute the complete orator, or the poet. Hence we easily perceive, that of all that once gave eloquence to the orations of Cicero, and harmony to the strains of Virgil, we now retain but a concatenation of vowels and consonants, and, comparatively speaking, but a lifeless syllabication. Notwithstanding, however, this latitude for doubt, and the difficulties to which the question is liable, several, with little hesitation, define the quantity of a syllable to be the duration of the voice in pronouncing it. But whilst this, on the

the one hand, renders the whole poetic fabric consistent, it is, on the other, not a little at variance with the customary and established pronunciation of many who are amongst the principal advocates of prosodial orthoepy, as well as with the manner in which the language is frequently pronounced among the moderns, at least by the British nation at large. To the youth committed to our care, we prescribe the laws of quantity, and we oblige them, on pain of disciplinary consequences, to pronounce the first syllable of *prōfugus* short, and that of *cōpia* long, because the former is a tribrac, and the latter a dactyl; but we not only allow them, but accustom ourselves to pronounce *nēpos*, *fīdes*, *glōbus*, and *conjūgium*, as though those several syllables were respectively long. And thus, whilst we contend that every syllable, foot, and verse, ought to have their due and requisite quantity, and, in partial instances, discountenance the violation of either; and whilst we define this quantity to be a duration of the voice, in such a manner that a long syllable shall occupy twice the time of a short one, and that a dactyl shall equal, in the duration of time, a spondee, in any case where habit, however degenerate, has formed our prepossession, we admit violations, with the loss of metre, equally incompatible. Thus, in pronunciation, we give the same time to the iambic foot, the pyrrhic, and the dactyl; as we do to the spondee, the choree, and the tribrac; and with equal facility convert the tribrac and the anapæst into the dactyl; and the acatalectic hexameter into the brachycatalectic, or rather into what is at once destitute of all rule or definition. This is certainly an evident inconsistency, the discreditable continuance of which becomes a greater impediment to the prosodial acquisitions of youth than is generally imagined, and demands not only the consideration, but the agreed and united decision of all that advocate the cause of classical erudition.

The English are accused, not only of departing from the genuine sound of the Greek and Latin vowels, but of violating the quantity of these languages more than any other European nation. The author of the Essay on the Harmony of Languages, gives us a detail of the particulars by which this accusation is proved; and this is a picture of the English pronunciation of Latin, so accurate as to give it every claim to our citation.

“The falsification of the harmony by English scholars in their pronunciation of Latin, with regard to essential points, arises from two causes only: first, from a total inattention to the length of vowel sounds, making them long or short merely as chance directs; and secondly, from founding doubled consonants as only one letter. The remedy of the last fault is obvious. With regard to the first, we have already observed that each of our vowels has its general long sound, and its general short sound totally different. Thus, the short sound of *e* lengthened is expressed by the letter *a*, and the short sound of *i* lengthened is expressed by the letter *e*. And with all these anomalies usual in the application of vowel characters to the vowel sounds of our own language, we proceed to the application of vowel sounds to the vowel characters of the Latin. Thus, in the first syllable of *sīdus* and *nōmēn*, which ought to be long; and of *mīser* and *ōnus*, which ought to be short; we equally use the common long sound of the vowels; but in the oblique cases, *fīderis*, *nōminis*, *mīseri*, *oneris*, &c. we use quite another sound, and that a short one. These strange anomalies are not in common to us with our southern neighbours the French, Spaniards, and Italians. They pronounce *sīdus*, according to our orthography, *seedus*, and in the oblique cases preserve the same long sound of the *i*. *Nomen* they pronounce as we do, and preserve, in the oblique cases, the same long

sound of the *o*. The Italians also, in their own language, pronounce doubled consonants as distinctly as the two most discordant mutes of their alphabet. It is a matter of curiosity to observe with what regularity we use these solecisms in the pronunciation of Latin. When the penultimate is accented, its vowel, if followed but by a single consonant, is always long, as in Dr. Foster's examples. When the antepenultimate is accented, its vowel is, without any regard to the requisite quantity, pronounced short, as in *mirābile*, *frīgidus*; except the vowel of the penultimate be followed by a vowel, and then the vowel of the antepenultimate is, with as little regard to true quantity, pronounced long, as in *maneo*, *redeat*, *odium*, *imperium*. Quantity is, however, vitiated, to make *i* short, even in this case, as in *oblivio*, *vineā*, *virium*. The only difference we make in pronunciation between *vineā* and *venia*, is, that to the vowel of the first syllable of the former, which ought to be long, we give a short sound; to that of the latter, which ought to be short, we give the same sound, but lengthened. *U*, accented, is always, before a single consonant, pronounced long, as in *hūmerus*, *fugiens*. Before two consonants, no vowel sound is ever made long, except that of the diphthong *au*, so that whenever a doubled consonant occurs, the preceding syllable is short.”

In speaking of improper pronunciation as arising from the want of due attention to quantity and accent, Mr. Pickbourn, the ingenious author of a Dissertation on the English Verb, justly observes, (Monthly Magazine, N^o 135.) “That scholars err in their pronunciation of, 1st, words of two syllables having the first short, as *equēs*; 2dly, words of three syllables having the first long and the second short, as *fīdera*; 3dly, polysyllables accented on the antepenultimate; as *juvenilibus*, *interea*, &c.; and lastly, words ending in a long vowel, as *domini*, or in a long vowel and a single consonant, as *dominis*. These errors arise in part from the want of distinguishing between the long and short powers of the vowels, and in part, from the indistinct and confused notion which we have of accent. For, when it falls on a short syllable, we often make that syllable long; and when it falls on a long one, we sometimes make it short. Accent does certainly affect quantity; that is, it makes the accented syllable a little longer than it would be without it. But its operation is never so great, as to make a short syllable become long, nor does the privation of accent make a long syllable become short; for there are degrees of time both in long and short syllables. All short syllables are not equally short; nor are all long ones equally long.” This remark is fully confirmed by a passage quoted by Dr. Warner (in his Metron Ariston) from Quintilian: “Et longis longiores, et brevibus sunt breviores syllabæ.” The second syllable of *amāvit*, being accented, is a little longer than the second syllable of *amaverunt*, though they are both long syllables; and the first syllable in *lēgi*, being accented, is a little longer than the first syllable of *legisti*, which is deprived of accent, though they are all long syllables. In pronouncing such words as *animus*, *dominus*, *oculus*, &c. though the vowels retain their short sound, yet the stroke of the voice laid on the first syllable increases the impression which that syllable makes on the ear, and consequently, diminishes the impression made by that which follows it.

We have already observed, that since in the English language, dissyllables accented on the first syllable, generally have that syllable long, we have, very improperly, applied this rule to all Latin dissyllables, because they are accented on the first syllable. Hence we say, *ēquēs*, *cōmes*, *mīser*, *nēmus*, *vīgor*, *rīgor*, *līquor*, *tīmor*, &c. making the first syl-

iable long, or at least nearly so. Why do we not pronounce the first syllables of *ēques, cōmes, miser, nēmus*, as we do the first syllables of their genitives, *ēquitis, cōmitis, miseri, nēmoris*? And why do we not pronounce such words as *vīgor, rīgor, liquor*, as we do the English words *vigour, rigour, liquor*? And the first syllable of *tīmor*, as we do the first syllable of *tīmoris*, and of the English word *timorous*? If we pronounced the first syllable of the adjective *mālus*, as we do the first syllable of the English word *malice*, we should properly distinguish it from *mālus*, an apple tree. By an attention to this rule we should easily distinguish between the present and perfect tenses of many verbs, as *vēnit* and *vēnit*, *fūgit* and *fūgit*, *lēgit* and *lēgit*, &c. Again, since many English words of three syllables accented on the first have that syllable short, we have, therefore, hastily concluded that all Latin trisyllables, accented on the first, must have that syllable short, unless it be long by position, and therefore, very improperly, we say, *līmīna, līmīte, sēmīne, vīribus, dīcere*, &c. Why do we not pronounce the first syllable of these words with a long vowel sound, in the same manner in which we pronounce the first syllables of *līmēn, līmēs, sēmēn, vīres, dīco*, &c? An attention to this remark would shew the difference between *pōpulus*, a people, and *pōpulus*, a poplar tree. In polysyllables accented on the antepenultimate we sometimes err in a similar manner, by giving a short sound to a vowel long by nature, as *juvēnīlibus*; and, at other times, by giving a long sound to a vowel naturally short, as in *intērea*. But in words of this kind, we do not universally err, for few pronounce such words as *depōsitum, consīlium, exīlium, exīdium*, &c. improperly. Lastly, words ending in a long vowel, as *domīni*, or in a long vowel followed by a single consonant, such as datives and ablatives of the first and second declension, and genitives singular, nominatives, accusatives, and vocatives plural of the fourth declension, as *domīnis, gradūs*, should always be uttered with a long vowel sound, though the accent or stress can never fall on such syllables except by a very singular poetic licence. The same judicious critic, in an ingenious little treatise on Metrical Pauses, adds, that, in accented antepenults, a short is commonly pronounced right, as in *animal*, but sometimes wrong, that is, with a long vowel sound, as in *gālea, fāteor, tāceo, cesāries, Mānālios*; a long is generally pronounced wrong in trisyllables, as *pābulum, grāmina, māchina*; but right in some polysyllables, as *mortālia, navālia*; and wrong in others, as *spectācula, levāmine, imāgine*. *E* short is sometimes improperly made long, as in *sēnior, sēnibus, mēlior, obsēquium, vēniet, invēniet*; but it is generally pronounced right in *trēpidus, gēmitus, ēpula, vulūcribus*, &c. *E* long is generally pronounced right in polysyllables, as *carchesia*; but wrong in trisyllables, as *semīna, legibus*. *I* short is always right, as *tīmīdus, consīlium*; *i* long, always wrong, as *frīgīdus, mīlite, frīgore, spīritus, formīdīne, sīdere*, (noun and verb,) *convīvium, senīlia, dīvīnitus, oblīvia*. *O* short is generally pronounced right, as in *dōminus, incōlumis*, but sometimes wrong, as in *ōdium, mōriens, mōveo, infōdiunt*. *O* long in some words is pronounced right, as *ōtium*, but in many others wrong; as *pōculum, honōribus*. *U* short generally wrong, as *incūbuit*, but not always, for *subīgit* is commonly pronounced right. *U* long always right, as *lūmine, cacūmine*, &c.

Since in making these observations on quantity, we have been under the necessity of incidentally introducing Mr. Pickbourn's opinion on the influence of accent on quantity, in justice to this part of the subject we are here obliged to offer a remark, which we find in Dr. Valpy's excellent Greek Grammar. This latter gentleman, in some degree, differs from

the former. He observes, "that the elevation of the voice does not lengthen the time of that syllable, so that accent and quantity, by the best critics, are considered as perfectly distinct, and by no means inconsistent with each other. In our language the accent falls on the antepenultimate equally in the words *liberty* and *library*, yet, in the former, the tone only is elevated, in the latter, the syllable is also lengthened. The same difference exists in *bāron* and *bācon*, in *lével* and *léver*. In words of two and of three short syllables, the difference between the French and English pronunciation is striking. The former make iambs and anapæsts, the latter chorees and dactyls. The French say, *fugis, fugimús*; the English, *fúgis, fúgimus*. In many instances both are equally faulty; thus we shorten the long *is* in *fāvīs*, the plural of *fāvus*; they lengthen the short *is* in *ōrīs*, the genitive of *os*. Indeed, both may be said to observe neither accent nor quantity."

This deviation from ancient quantity is not, however, peculiar to the English; for Beza complains in his country. "Hinc enim fit ut in Græca oratione vel nullum, vel profus corruptum numerum intelligas, dum multæ breves producuntur, et contra plurimæ longæ corripuntur." (Beza de Germ. Pron. Græc. Ling. p. 50.) Middleton makes the same remark concerning the Latin: "Erasmus se adfuisse olim commemorat, cum, die quodam solenni, complures legati ad Maximilianum Imperatorem salutandi causâ advenissent; singulosque, Gallum, Germanum, Danum, Scotum, &c. orationem Latinam, ita barbarè ac vastè pronunciâsse, ut Italis quibusdam, nihil nisi risum moverint, qui eos non Latinè sed suâ quemque linguâ, locutos jurassent." Middleton de Lat. Pron.

We have now stated at length the manner in which ancient quantity is violated by the moderns, and more particularly by the English. Every symptom of the disease being thus known, our following remarks will be a regular series of inquiries directed to its remedy. In the course of these investigations we are circumscribed by the following alternatives, one or the other must be the object of our decision: whether, in our pronunciation of the ancient languages, shall we adhere to the grammatical metre, though it certainly will in many instances occasion a practice discordant to our habitual predilection; or shall we maintain the English usage, though it should render dactyls, spondees, hexameters, pentameters, &c. merely ideal; at least, subjects not of auricular but of ocular perception.

Since the adoption of prosodial pronunciation occasions, in many instances, a practice so discordant to habitual usage and prepossessions of the schools, there are not wanting some, that contend for the continuance of the English custom. But since the inconsistencies of this, as we have already pointed out, with any idea we can form of quantity, either in a poetic foot, a verse, or a poem, are so notorious, and manifestly render the pentameter and hexameter verse, and every poetic metre, imaginary and speculative, we cannot enter the lists on this side of the question. For he that shall choose to employ his time in enlarging on the beauties of the poet, beauties of which he has no apprehension, except through the medium of their violation, is certainly nearly allied to the virtuoso, that never gives his sentiments on the beauty and proportion of an edifice, except on an actual demolition of all that constitutes them; and having reduced the whole into mutilated and disorganized confusion, he, with much apparent discernment, descants on the beautiful order and symmetry of their coherence and general arrangement.

But, on the other hand, it may be asked, however an adherence to prosodial quantity might prove at variance with our current usage; and, however, with the inconsiderate

derate it might, until a more mature judgment was formed, be liable to the charge of affectation, would it not be one of the most successful auxiliaries to secure the retention of quantity in the memory of every learner? And as an adherence to it is grammatically unimpeachable, would it be the part of temerity and presumptive innovation, to make the coincidence of pronunciation and the prosodial rule, the reciprocal echo and *memorial* auxiliary? We may add, that if we adhere to poetic quantity, the "Norma loquendi" is immutable and certain, but if we warp to fashion, like some erratic sphere, we seem to move in an eccentric orb; especially when we consider that there are the Italian, Spanish, French, German, and English fashions, and each of these, no doubt, is susceptible of variations tinged by every subordinate provincialism.

Three methods present themselves to enable us to preserve the prosodial quantity. 1st. To allow every vowel its prescribed duration, without altering the customary division of syllables; as *nō-ta*, *lō-cus*, &c.; but this will oblige us to throw the accent on the second syllable, as *glō-būs*, contrary to the laconic canon of Sanctius:

"Accentum in se ipsa monosyllaba dictio ponit.
Exacuit sedem dissyllabon omne priorem.
Ex tribus extollit primam penultima curta.
Extollit se ipsam quando est penultima longa."

And it will very frequently occasion the following vowel to be long; as, *tē-nē-o*, contrary to, "Vocalis ante alteram in eadem dictione ubique brevis est."

2dly. If then we must abandon the preceding method, we have the alternative left of uniting to the preceding vowel the succeeding consonant; as, *nōt-a*, *lōc-us*. But still some difficulty occurs, for, first, this method would in many instances occasion pronunciations very harsh to our customary prepossessions; as, *grād-us*, *cād-o*, *plīc-o*, *stūp-e-o*, *bōn-us*, *jūb-e-o*, *tēn-e-o*, *mān-e-o*, *īnūm-e-rus*, *trīb-us*, *hōn-os*, *fāv-or*, *fūt-u-rus*, *jūg-um*, *fīd-es*, *pēt-o*, *tīm-or*, *tīm-e-o*, *vīd-e-o*, "Homines tuentur illum glōb-um." "Per-tāsum est con-jūg-ii," &c.

But is this really an objection? Have not custom and long established usage the power of warping the mind, and giving it prejudices against that which in its unbiassed state it would have adjudged to be agreeable and elegant? This from innumerable instances we are assured to be a fact. But the argument need not rest here. For we may very reasonably inquire, is all this harshness of pronunciation of which we appear to be so sensible, actually chargeable on the ancients? Does it not arise rather from the mistaken ideas we have formed of the power of their vowels and consonants, which, if rectified, would render the harmony of pronunciation and prosodial quantity again consistent? It is here, however, incumbent on us to offer a few leading remarks, as may, under the further inquiries of the patient and persevering philologist, tend to reconcile what might otherwise remain at variance.

Concerning the quantity of vowel sounds, Lipsius (de Pronun. Ling. Antiq.) has some singular remarks; and as they are calculated to afford some further information on this doubtful subject, we cannot with propriety withhold them. "Aliter omnino vocales longas pingere veteres soliti, aliter contractas. Nam has solitarias ponebant ad exemplum hodiernum, illas geminabant, ut duplicatione ipsā, duplicem et productum in iis ostenderent illum sonum. Hunc usum scriptores prisca mihi firmant; ut Victorinus Afer, Nævius et Livius: 'cū longa syllaba scribenda esset, duas vocales ponebant.' Quintilianus id vult, his verbis, 'correctas syllabas geminis vocalibus scribere.'

Attius inquit, 'geminatis vocalibus scribi naturā longas syllabas voluerunt, posteaquam adjecto vel sublato apice, quantitatem vocalium expresserunt.' Qui bene, tamen, de apice monet, quem secuta ætas ut compendium faceret, pro geminatione usurpavit. Apicem appello, lineam transversam, quam superjicere vocalibus longis soliti, hoc modo, *ā, ē, ō, ū*: nam *i* consultò omisi, quæ sola nec geminata olim nec apicata, ut dicam infra. Hæc linea est, quam Græci τὴν μακράν dixere A longa, velut, *a, æ*, geminata, est. Sic dices *amaabam*, *essaari*, *faatam*. Sic distingues *maalum* in navi aut in pometo, ab homine *malo*. Sic *lingua* tibi secernetur à *linguaa*, in sexto casu. Hæc Suevorum in sua linguâ, etiam hodie, pronuntiatio et scriptura est: hæc veterum fuit. Sic in libris antiq. et lapidibus invenitur: ut hæc scriptura, C. NVMONIVS VAALA, apud Horatium in Mitis est. In lapide, L. BETILIENUS, L. F. VAARUS. *Abala*, an rectè, et an non veriùs *Ala*, frustra litigant viri docti. Ego eos moneo, *Aala* fuisse olim, ex ratione geminandi, quam dixi, et flatum solitum interponi sæpe ad sustentandum, sive etiam molliendum. Simile est, quod mehe pro me, antiqui litteratores notant, et mehecum. Nec ab alio fonte prehendo, vehemens. E, pinguis enunciata ut *ee* duplex: enunciata sed et scripta. In nummis legimus, 'Faustus felix;' in lapide, 'Basilicam, Calecandam, Seedes.' Quæ autem hæc pronuntiatio? Me judice, illa, quæ apud Gallos, in plerisque Latinis vocibus hæsit, *miel, fiel* dicunt pro *melle, felle*: ipsis verbis prisca, et fortasse, Germano sono. Nam olim fuit *meel, feel*. Sonum I primum longum, et verè longum. Quia non, ut ceteræ geminatur, aut apice insignitur; sed productior fit, et longitudine velut duplâ; ut *pliso, vlvvs, ædlis*; idèο *αα* *εε* *οο* inter omnes literas hæc proprie dicta longa. Plautus hoc scivit, et jocum captavit in personâ Staphylæ, 'ex me unam faciam litteram. De O, Aufonius ait,'

'Ω quod et O Græcum, compensat Romula vox O.'

In eodem modo, *o* longa, dicebant *populus* de arbore, *voocem, ooram, prætoorem*, et talia; propemodum ut nos Galli, *foy, voix, noife*; vos Belgæ, (ita docuere me tui populares), melius, qui et scribitis pariter et effertis *Broot* (panem), *Schoot* (sinum), *Boom* (arborem). *o* mihi superest, latus et exilis. Ille, qui *α* Græcum exprimit, iste qui *o* eorundem. Varro sic discriminat, his verbis, 'Quidam reprehendunt quòd *pluit* et *luit* dicamus in præterito et præsentis tempore. Falluntur, nam est, ac putant, aliter. Quod in præterito *u* dicimus longum, *pluit, luit*, in presenti breve.' Hoc enim vult, *pluit, luit*, in presenti tenuiter efferrî, in præterito, *plouit, louit*." And this mode of expressing the sound, by French orthography, will in ours be expressed by *plooit* and *looit*.

"E, in Latin as well as Greek," says Ainsworth, "was pronounced *u*." But from the circumstance of their anciently writing ΤΕΙ ΑΓΑΘΕΙ ΤΥΧΕΙ for τῆ ἀγαθῆ τυχῆ, it is to *η* that he attributes the power of *u*. But since it is ambiguous, and the attempt inconclusive, to explain the sound of one ancient vowel by another, the most satisfactory and decisive method, as far as it can be done, is to have recourse to the more immutable sounds of nature. Monsieur Launcelot, the learned author of the Port Royal Greek Grammar, in order to convey the sound of the long Greek vowel *η*, tells us "it is a sound between the *e* and *a*; and that Eustathius, who lived towards the close of the 12th century, says that βῆ, ἐῆ, is a sound made in imitation of the bleating of a sheep; and to this purpose quotes the following verse of an ancient writer, Cratinus.

PROSODY.

“ Ο δ' ἠλίθιος, ὡσπερ πρόβατον, βῆ, βῆ, λεγὼν βᾶδιζει.”

“ Is fatuus perinde ac ovis, bē, bē, dicens incedit.”

“ He, like a silly sheep, goes crying baa.”

In a similar manner, the sound of the long *i* is preserved to us by the word *pīpio*, which signifies to pip like a chicken; and since their note is nearly what we may express by *pee-ep*, the long power of that letter seems to have been equivocal to our *ee*. Eustathius likewise remarks on the 499th v. of Iliad I. that the word βλοψ̄ ἐστὶν ὁ τῆς κλειψύδρας ἤχος μιμητικῶς κατὰ τὴν παλαιὰς βί' ἔχει μίμησιν προβάτων φωνῆς. Κρατινος, i. e. βλοψ̄, is, according to the ancients, an imitation of the sound of the clepsydra; et βῆ imitates the bleating of sheep. The clepsydra was an instrument to measure time by water; (and, it should be particularly observed, was occasionally employed to measure time for the regulations of orators, and in other recitations.) Abstracting the *o* in βλοψ̄ from the effect of position before ψ, it will, as we shall determine hereafter, have the power of our *o*; and *blops* adequately imitates the noise of water running with intermissions out of a narrow-mouthed vessel; and, with the French pronunciation, with equal propriety, is signified by the word *glouglou*; but not quite so happily by us, by the word *guggle*. Ainsworth seems to consider, that the long sound of *o*, was equal to *ε*. To determine this, it may be useful to quote the word *glōcio*, to cluck as a hen (from κλωζω), particularly since this word, amongst many others, will prove an irrefragable proof that *c* amongst the ancients was equivocal to *z*, or hard, since *glouk*, *glouk*, is the sound produced by the hen after the period of incubation. The sound of the long *u* is no less sincerely preserved by Plautus in Menæch. page 622. edit. Lambini, in making use of it to imitate the cry of an owl:

“ Men. Egon' dedi? Pen. Tu, Tu, istic, inquam, vin' afferri noctuam,

Quæ tu, tu, usque dicat tibi? nam nos jam nos defessi fumus.”

It appears here, says Mr. Foster, in his defence of the Greek accents, page 129, that an owl's cry was *tu, tu*, to a Roman ear; *tou, tou*, to a French; and *too, too*, to an English one. Lambin, who was a Frenchman, observes on the passage, “Alludit ad noctuæ vocem *tu, tu*, seu *tou, tou*.” On this Mr. Walker remarks, that the English have totally departed from this sound of the *u* in their own language, as well as in their pronunciation of Latin. Ausonius confirms this power of *u*: “Cecropiis ignota fonis, ferale fonans U. Ferale idèò, quia refert feralem illam avem.” This also explains the reason of the Latin word *būbulo* expressing the cry of an owl. Aristophanes has handed down to us the pronunciation of the Greek diphthong *ᾶν ᾶν*, by making it expressive of the barking of a dog. This is what is exactly preserved by nurses and children to this day in *bow*, *wow*. This is the sound of the same letters in the Latin tongue, not only in proper names derived from Greek, but in every other word, where this diphthong occurs. Most nations in Europe, perhaps all but the English, pronounce *audio* and *laudo*, as if written *owdio* and *lowdo*; the diphthong sound like *ou* in *loud*.”

In prosecuting a further enquiry on the sounds of ancient vowels, as preserved to us by the sounds of nature expressed by words, on the etymology of which lexicographers judge the most appropriate remark to be “*verba ex sono facta*,” what light may result from the following and similar expressions, the further investigations of philologists may determine. *Balo*, βᾶ, to *bleat* as a sheep; *boō*, from βωω, to *low* as an ox; *crocio*, from κρόραξ or κρώζω, which was, it

appears, not pronounced *crofio*, but *crokio*, to *croak* as a crow; to which we may add, *crepo*, to *creak* as a door; *su-furrus*, a *buz* or *ruffling*; and *strix*, a *screech owl*. But *gannio*, to *yelp* as a fox; *hinnio*, to *neigh* as a horse; *tinnio*, to *tinkle*; are not, perhaps, sufficiently abstract from consonant admixture to afford much additional intimation.

These remarks, however, may already serve to remove the harshness in some of the words which we have exemplified. For since the long *u* has been so fully proved to have been equivocal to *oo*, which Dr. Carey confirms, by considering it equivalent to the Greek *ε*, and to the sounds in the Italian *pur*, the French *pour*, and the English *poor*, we may suppose, that the ancients pronounced *lumen*, according to our orthography, *loomen*, and allowed the power of the middle *u*, as in *cube*, to their short accented *u*, and that of *ū*, as in *cub*, to their short unaccented *u*, i. e. when the accent rested on the following consonant. Hence, instead of being compelled to divide *nūm'-er-us*, *fū'-u-rus*, *flūp'-e-o*, *jūb'-e-o*, so as to throw the accent on the latter consonant of the first syllable, we may adopt a distribution more reconcileable, at least with our habits, and by placing the accent on the first vowel instead of the following consonant, may give the short Roman accented *u*, the sound of *u* in *tube*, and pronounce nearly as usual, *nū'-me-rus*, *fū'-tu-rus*, *jū'-be-o*, &c. Relative to *jugum* and *conjugium*, we shall here avail ourselves of a remark from Dr. Carey. “The word which in England we pronounce *jugum*, is in reality *yugum*, as the Germans, in fact, at this day, pronounce it. Of this, indeed, there is little doubt, since *יאכׁב* was properly *yakōb*, and the Hebrew *י*, before a vowel, had the power of *y*. Now, by these remarks being warranted, first, to place the accent on the first vowel of the root *jū'-gum*; secondly, to give the power of the middle *u* to the short Roman accented *u*; and thirdly, that of *y* to *j* before a vowel, we may avoid nearly all the harshness for which these words would otherwise have been notorious; as *yū'-gum*, *con-yū'-gium*. The same unpleasantry may be removed from *glōb'us*, since the long Roman *o* is considered to have been equal to *ε*, which is more exactly represented by our *au*; for *hōra* was probably pronounced *haura*, since it is borrowed from the Hebrew *אור*, *aur*, and *aurōra* from *אור*, *aur* (propitious light), or *owraura*. Therefore the middle *o*, as in *note*, may be ceded to the short Roman accented *o*, and for *glōb'-us*, we may, more agreeably, say *glō'-bus*.

Whatever may be done, however, in this way, we cannot but consider, here, as partial hints, given rather in the hope of calling forth the future investigations of the literati to an enquiry, the want of which has been long felt, than propose the present as a mature and established system. Doubtless it may not be easy to remove every difficulty, so as, in every instance, to reconcile the prosodial pronunciation with our prejudices. Nor will it, perhaps, be done, until the influence of accent on quantity is more fully understood, nor unless it be clearly considered, whether the accent falls on the *vowel* or *succeeding consonant*. Many have undertaken to assign the syllables, which constitute the seat of the accent, but few distinguish the *accented vowel* from the *accented consonant*. And here, perhaps, the solution of the whole may be found. It is evident, that *nī'-les* has the accent on the first syllable, and on the vowel of that syllable; hence it is easily preserved long. And, it is equally obvious, that *honorificus* has the accent on the antepenultimate, and on the consonant *f* of that syllable; and, therefore, it more rapidly inclines to an increased brevity. And the same distinction should have been allowed by the writer we have already cited, in the words he has quoted to prove the

the independence of accent and quantity. It is certainly true, that *liberty* and *library* are accented on the first syllable, which in the first instance is short, in the second long; but the former has the accent on the consonant, *lib'-er-ty*; the latter on the vowel, *li'-bra-ry*. The same distinction exists in the words *báron* and *bácon*, *lével* and *léver*. Now, in such words as *grádu*s, *cádo*, *plíco*, *fídes*, *tríbus*, *tímor*, all which are accented on the first syllable, the question is, did the ancients throw the accent on the final consonant of the syllable? If so, that syllable will be pronounced with rapidity, to throw the stress on the accented consonant; and that pronunciation will be aptly expressed by the following distribution, *grád'-us*, *cád'-o*, *plí'co*, *fíd'-es*, *tríb'-us*, *tím'-or*. Or did they rather allow a distinction between an accented short vowel, and an unaccented short vowel, lengthening, in some degree, the former, in the same manner, as we have seen that a difference exists between an accented long, and an unaccented long syllable, in the examples *amāvi* and *amāvé-runt*; which will fully illustrate the remark of Quintilian, which we have cited before. This influence might allow an increase to their short accented *a*, *e*, and *i*, nearer to their unaccented long sound; so that, on this ground, consistent at once with quantity and our prepossessions, we might pronounce, *grá'-dus*, *cá'-do*, *plí'-co*, *fí'-des*, *trí'-bus*, and *tí'-mor*.

The second difficulty to which we are liable in our apprehension of the nature of ancient quantity, arises from that, which is said to be long by *position*. From this some have deduced an objection against the attempt to conform the present pronunciation to quantity; observing, that "if we would be consistent and unexceptionable in our adherence to prosodial metre, we have to recollect, that the same word is often both long and short; as *nēc*, when single, or not followed by a consonant; which by position we find long; as *Fulgura nēc diri toties arsere cometa*. Then, if we invariably echo the quantity, we must, *pro re natá*, say *nēc*, and *nēc diri*, i. e. *neck*, and *neck diri*. And the improbability, that the ancients were so ready on every occasion to pronounce the same word both long and short, would incline us to infer, that we have no idea of what they meant by quantity."

This has given rise to a series of remarks in Mr. Walker's Treatise on Classical Pronunciation, which, if they are not, in every instance, the most decisive, are at least the most ingenious that we have seen on the question, and with which it is impossible to dispense, in a full and impartial consideration of this subject.

"The long quantity of the ancients must arise either from a prolongation of the sound of the vowel, or from the delay of the voice, which the pronunciation of two or more consonants in succession are supposed naturally to require. Now, vowels were said to be either long by nature, or long by position. Those vowels which were long by position, were such as were succeeded by two or more consonants; as the first *o* in *sponsor*. If the long quantity of the ancients was the same distinction of the sound of the vowel as we make in the words *cadence* and *magic*, then the *a* in *māter* and *pāter* must have been pronounced like our *a* in *paper* and *matter*: and those vowels which were long by position, as the *a* in *Bāchus* and *cāmpus*, must have been sounded by the ancients as we hear them in the words *bake* and *came*. But if the long quantity of the ancients was no more than a retardation of the voice on the consonants, or that duration of sound which an assemblage of consonants is supposed naturally to produce, without making any alteration in the sound of the vowel, of such long quantity as this an English ear has not the least idea. Unless the sound of the vowel be altered, we have not any conception of a long or short

syllable; and the first syllables of *banish*, *banner*, and *banter*, have, to our ears, exactly the same quantity. The same may be observed of *senate*, *seminary*, *sentence*, and *sentiment*;" (and if, as an ingenious inquirer into this subject has asserted, the ancients pronounced both the consonants in *callidus*, *fallo*, &c. this seems to shorten, rather than lengthen, the vowel of the first syllable.) "If, however, the quantity of the ancients lay only in the vowel, which was lengthened and shortened in our manner by altering the sound, how strange must have been their poetical language, and how different from the words taken singly! And when these observations on the quantity of the ancients are collectively considered, shall we wonder that the learned and ingenious author of the Elements of Criticism should go so far as to assert that the dactyls and spondees of hexameter verse, with respect to pronunciation, are merely ideal, not only with us, but that they were so with the ancients themselves? Few, however, will adopt an opinion, which will necessarily imply that the Greek and Latin critics were utterly ignorant of the nature of their own language; and every admirer of those excellent writers will rather embrace any explanation of accent and quantity, than give up Dionysius of Halicarnassus, Cicero, Quintilian, and Longinus. Suppose, then, as a last refuge, we were to try to read a Greek or Latin verse both by accent and quantity, and see what such a trial will produce.

"By quantity, let us suppose the vowel lengthened to express the long quantity; and by the acute accent, the rising inflexion; thus:

"Títýre, tú pátulæ récubans fúb tégmíne fági,
Sýlvéltrem ténuí múfam medítáris avéna.

"Títýrē, tū pátulā rēcūbāns fūb tēgmínē fāgī,
Sýlvéltrem tēnuī mūfām mēdítāris āvēnā.

"Teétyre toó pátulæ récubanes foób teégmíne fági,
Seélveeltrem ténuí moófame medítáris avena.

"Μῆνιν ἄειδε θεὰ, Πηληϊάδεω Ἀχιλῆος
Οὐλομένην, ἣ μυρὶ Ἄχαιοῖς ἄλγε' ἔθηκεν.

"Μῆνιν ἄειδ'ε θεᾶ, Πηληϊάδεω Ἀχιλῆος
Οὐλομένην ἣ μυρὶ Ἄχαιοῖς ἄλγε' ἔθηκεν.

"Mein-en á-eye-de The-áy Pei-lei-e-á-dyo A-kil-lei-ose
Ow-lom-én-ein heì moo-ré a-kay-oês al-ge éth-ei-kei.

"Now there are but four possible ways of pronouncing these verses, without going into a perfect song. One is to pronounce the accented syllable with the falling inflexion, and the unaccented with the same inflexion in a lower tone; which is the manner in which we pronounce our own words, when we give them the accent with the falling inflexion. The second is to pronounce the accented syllable with the rising inflexion, and the unaccented syllables with the same inflexion in a lower tone; which we never hear in our own language. The third is to pronounce the accented syllable with the falling inflexion, and the unaccented syllables with the rising, in a lower tone. And the fourth, to pronounce the accented syllable with the rising inflexion, and the unaccented with the falling, in a lower tone. None of these modes, but the first and last, do we ever hear in our own language: the second and third seem too difficult to permit us to suppose that they could be the natural current of the human voice in any language. The first leaves us no possible means of explaining the circumflex; but the last, by doing this, gives us the strongest reason to suppose that the Greek and Latin acute accent was the rising inflexion, and the grave the falling inflexion, in a lower tone."

To render Mr. Walker's remarks, as they relate to the influence of accent on quantity, a little more familiar to our readers, it may be useful to state, that his ideas of accent comprehend the qualities of *high* and *low*, *rising* and *falling*. His acute accent is higher than the grave, effected by a rising *slide* of the voice; the grave is lower than the acute, and effected by a falling *slide*. All this may be very conveniently illustrated by the violin; for whilst the *tone* (louder or softer) is produced by the greater or less strefs of the bow, the finger *sliding* upwards on the first string, in slow time, will give the acute or *rising* accent, as on a *long* syllable, or when the vowel is accented. The same upward slide, with a *quicker* movement, will express the same accent on a *short* syllable, or when the accent *falls* on the following consonant. And by a *downward slide*, either in *slow* or *quick* time, the *grave* accent is equally imitated on a *long* or *short* syllable.

Our opinion, however, deducible from the analogy of quantity long by position, is not such as to occasion our hesitation relative to the nature of quantity in general. But we are persuaded, *first*, that quantity long by nature, and long by position, were, *as it respects the vowel*, different. We are confirmed in this by Lipsius, whose remark is, "Syllaba quæ natura longa est, ab ea distingui debet, sola positione longa existit. Id est idcirco tantum quod duabus consonantibus adjuncta sit, quibus pronuntiandis necesse est moram interponendi, ut in τυπιτητον productior est penultima quam in τυπισηθα. Præterea pro qualitate consonantium quæ vocales ipsas præcedunt, vel consequitur, inter longas aliæ aliis longiores, inter breves aliæ aliis breviores reperiuntur. Sed hæc subtilius persequi, nostri non est instituti. Admoneri tamen pueri debent et assuescieri, ut hæc omnia discrimina expedite observent, sine quorum cognitione et usu fieri non posse puto ut de numeris orationis rectè judicent."

But an irrefragable argument that quantity long by position was really different from that long by nature, is deducible from such sounds as nature has faithfully handed down to us; as in the word *scloppus* or *floppus*, which signifies the noise produced by the percussion of inflated cheeks, which *scloppus* pronounced short, *as it respects the vowel*, will very well resemble; but that similarity becomes entirely lost, on lengthening it. On this word, see Priscian. lib. i. cap. 4, Facciolatus, and Perf. sat. 5. 13. "Nec scloppo tumidas intendis rumpere buccas." The same observation may be made from the word βλοψ, already quoted, which signifies the noise effected by water, flowing with intermissions, from a narrow-mouthed vessel.

Hence it appears, that syllables indifferently spelt with one or two consonants, which are always long, are not strictly entitled to the quantity equal to that of a vowel long by nature; as in *litus* or *littus*, *literæ* or *litteræ*, *scïroma* or *scïrroma*, &c.

Secondly. If then quantity long by nature was different from that long by position, we may suppose that the quantity of the former consisted in the *duration of the vowel sound*, and that of the latter in the *length of the syllable*. To explain this more particularly, let us suppose, *first*, that the regular quantity of a *short* syllable, generally, συλλαμβανει, comprehends either, 1st, a single syllable, as the first syllable of *ä-mo*; or, 2ndly, a consonant and a vowel, as *gē-na*: or, 3dly, a mute and a liquid, which could be sounded as a single letter, followed by a vowel, as *tri-fer*: or, 4thly, even three consonants and a following vowel, provided the three consonants could be sounded as one; as *Arō-pus*. So that the *regular quantity of a short syllable is reducible to two letters*. The only exceptions to this were in

such syllables, as custom, for some special reason, as in the case of derivation from *r, u, e, &c.* had made long; and as in the case of monosyllables, as *mē, tē, sē, &c.* which properly are long, since there being no haste of the voice to leave the first and proceed to the coalition of a second syllable, the first receives, from this exemption, a more leisure-effect, or such a compensation as its diminutive and detached condition seems naturally to require. *Secondly*, that if to the end of this short syllable we join a consonant, this forms that addition in quantity, which is to be considered rather as a *syllabic augmentation*, than any *temporal* duration of the voice: it may *alter* the sound, but it does not, in every case, perceptibly protract it; as $\zeta\lambda\epsilon\delta$ equal to $\zeta\lambda\epsilon\delta$, $\phi\lambda\omicron\zeta$ to $\phi\lambda\omicron\gamma\zeta$, $\sigma\alpha\epsilon\zeta$ to $\sigma\alpha\epsilon\gamma\zeta$, and *rexi* to *rek-si*. Hence all monosyllables and final syllables, beginning and ending with a consonant, are long; except they end in *b, d, t, l, r, is, us*, or in consonants preceded by the Greek short vowels, and a few other exceptions established by poetic usage. But if such syllables occur in the middle of a word, the following syllable must begin with a consonant; as *κοσ-μο*, *glof-sa*, &c.: otherwise the consonant is joined to the following syllable, as *glō-mus*. And, *lastly*, when the succeeding syllable begins with a mute and a liquid, in consequence of the coalition and unity of sound, having the effect only of one consonant, they are joined to the following syllable, and thus the first may remain short: *i. e.* instead of *πατ-ρος*, *τεκ-νον*, and *pāt-ris*, which would be long, we may divide and pronounce *πα-τρος*, *τε-κνον*, and *pā-tris*.

Now, concerning the question whether the ancient poetry should be read chiefly according to accent or quantity, which has lately been much agitated, may we not reasonably infer, that since the precise nature of accent does not seem to be determined, and therefore if, in reading, either must give way to the other, (for which, however, there is no absolute necessity,) it is certainly better, that what is in some degree uncertain should yield to that which is more accurately ascertained. By reading according to quantity, is not, however, meant the breaking down, splitting, or destroying the words by attending to the feet only; but pronouncing the words of a verse, so as to give, as much as possible, its due quantity, in real time, to every syllable. And as much as to this mode of reading, we can add an attention to accent, emphasis, tone, pause, and cadence, whether metrical or sentential, inasmuch, doubtless, will the pronunciation be the more correct and harmonious. Although it cannot, perhaps, in every case, be determined in what manner, precisely, the ancients sounded the vowels; one thing, however, seems certain, that they did not give a long sound to a short vowel, nor a short sound to a long vowel. In whatever way we pronounce them we ought to attend to their quantity; with only this licence, that since, as has been now fully proved, a syllable long by nature was a reduplication of the same vowel, as *dicere*; *maalus*, an apple tree; *populus*, a poplar tree; and that that long by position had no other length than its being sustained by the following consonants, as *divi*, we are authorized to consider the prolongation of such syllables to consist not in the *vowel*, but in the *consonant* reduplication.

We have now had an opportunity of offering our sentiments on the nature of ancient quantity. But the nature of quantity, as observed in the English language, is at once so simple, unique, and, in general, so well known, that any enlargement on this part of the subject becomes unnecessary. It is sufficient to observe that a vowel or syllable is, in the English language, long, and requires double the

the time of a short one, when the accent is on the vowel; which occasions it to be slowly joined in pronunciation with the following letters; as *fäll, bälē, hōūse, fēature*. And that a syllable is short, and only of half the length of a long one, when the accent is on the consonant; which occasions the vowel to be quickly joined to the succeeding letters; as *ärt, bönnēt, hüngēr*. For such rules as are necessary to the determination of quantity in each of the three principal languages, we refer our readers to the article QUANTITY. See also VERSIFICATION.

Profody might be applied to music as well as grammar: as the true pronunciation, or execution and accents of passages, constitute their true expression.

PROSONOMASIS, Προσωνομασια, a figure in Rhetoric, by which allusion is made to the likenesses of a sound in several names or words; much the same with *paronomasis*, or *agnominatio*.

PROSOPIS, in Botany, said by professor Martyn to be derived from προσωπις, *persona*, five *larva*, a mask.—Linn. Mant. 10. Schreb. 706. Willd. Sp. Pl. v. 2. 547. Mart. Mill. Dict. v. 3. Juss. 348. Lamarck. Illustr. t. 340.—Class and order, *Decandria Monogynia*. Nat. Ord. *Lomentaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. Cal. Perianth inferior, of one leaf, hemispherical, slightly four-toothed. Cor. Petals five, lanceolate, sessile, equal. Stam. Filaments ten, thread-shaped, equal; anthers twin, obtuse. Pist. Germen superior, oblong; style thread-shaped, the length of the petals; stigma simple. Peric. Legume long, inflated, of one cell. Seeds many, roundish-oblong, coloured.

Ess. Ch. Calyx bell-shaped, four or five-toothed. Stigma simple. Legume many-seeded.

1. *P. spicigera*. Linn. Mant. 68. Roxb. Coromand. v. 3. 45. t. 63. (*P. spicata*; Burm. Ind. 102. t. 25. f. 3.)—Common on the Coromandel coast, flowering at the close of the cold and beginning of the hot season.—According to Roxburgh this is a large tree, with a tolerably erect trunk. Bark deeply cracked, ash-coloured. Branches irregular, numerous, forming a globular shady head; some of the younger ones prickly. Leaves alternate, abruptly pinnate; leaflets from seven to ten pair, opposite, obliquely lanceolate, smooth, entire. Flowers in numerous, terminal spikes, small, yellow. Legume attenuated at both ends, jointed, smooth, pendulous. Seeds lodged in a brown mealy substance, which is eaten by the native Indians. It has a sweet, agreeable taste, and may be compared to the Spanish *Algaraba*, or Locust tree, *Ceratonia Siliqua*.

PROSOPOLEPSIA, Προσωποληψια, in Ethics, is used by some writers for that bodily impression, which inclines to the love or hatred, esteem or contempt of persons or things, on account of some slight or trivial circumstances attending them.

PROSOPOPŒIA, Προσωποποιια, formed from προσωπον, *person*, and ποιειν, *I make*, or *feign*, or *Personification*, in Rhetoric, a figure, by which we make persons that are absent, or dead; or even things which are inanimate, as cities, &c. to speak.

The poets, in their fictions, make frequent use of the prosopopœia; as also do the orators, in their painting of violent passions, which seem to transport, and make them forget themselves.

This figure is of very extensive use to the orator: when he thinks his own character not of sufficient weight to affect his audience in the manner he desires, he substitutes a person of greater authority than himself to engage their attention. When he has severe things to say, and which may give offence, as coming from himself, he avoids this by putting

them in the mouth of some other person, from whom they will be better taken; or makes inanimate nature bring a charge, or express a resentment, to render it the more affecting. And by the same method he chooses sometimes to secure himself from a suspicion of flattery, in carrying a compliment too high. In the management of this figure, care should be taken, that what is said be always consistent with the character introduced, in which both the force and beauty of it consist.

There are two kinds of prosopopœias; the one *direct*, the other *indirect*. For an instance of the latter: *Just gods, protectors of the innocent, permit the order of nature to be interrupted for one moment, and let this carcase resume the use of speech.*

Instances of the former are found every where among the orators and poets: that which follows is a very beautiful one; found, by way of epitaph, on a tomb-stone: the dead wife addresses her surviving husband thus:

“Immatura peri: sed tu felicior, annos
Vive tuos, conjux optime, vive meos.”

This figure is of such importance both to the orator and poet, and contributes so much to give both beauty and effect to their respective productions, and to render them animated and impressive, that we shall enlarge on its origin, and its various kinds, and subjoin several appropriate examples of its use. Its origin may be traced to the constitution of human nature, which disposes us to animate all objects, and to those passions and affections, proceeding probably from our senses of pain and pleasure, which express themselves in an aversion from an attachment to certain objects, either animate or inanimate. A child turns to beat the ground, or the stone, that has hurt him, and most men feel some degree of affection for the old inanimate companions of their happiness, such as the house, in which they have passed many agreeable years, and the fields, trees, and mountains, among which they have often sauntered with delight. This strong impression of life, produced, more especially, by the more magnificent and striking objects of nature, has been, Dr. Blair conceives, one cause of the multiplication of divinities in the Heathen world. The belief of Dryads and Naiads, of the genius of the wood and the god of the river, among men of lively imaginations, in the early ages of the world, easily arose from this turn of mind. When their favourite rural objects had often been animated in their fancy, it was an easy transition to attribute them to some real divinity, or some unseen power or genius which inhabited them, or in some peculiar manner belonged to them. From such dispositions evidently originates the figure called prosopopœia, which is the distinguishing ornament of poetry, and which appears so conspicuous in all compositions, where imagination or passion has any concern. This figure is nearly allied to the metaphor, and still more to the metonymy: it is to the latter what the allegory is to the metaphor. Thus when we say, “Youth and beauty shall be laid in the dust” for persons possessing youth and beauty, it is hard to determine whether it be a metonymy or a prosopopœia. Lyric poetry, in which the imagination seems to have the fullest indulgence, and which abounds with strong figures, is most favourable to personification. Of this figure, according to Dr. Lowth, there are two kinds: one, when action and character are attributed to fictitious, irrational, or even inanimate objects; the other, when a probable but fictitious speech is assigned to a real character. The former evidently partakes of the nature of the metaphor, and is by far the boldest and most daring of that class of figures. Dr. Blair reckons three different degrees of

this figure; the first, when some of the properties or qualities of living creatures are ascribed to inanimate objects; the second, when those inanimate objects are introduced as acting like such as have life; and the third when they are represented, either as speaking to us, or as listening to what we say to them. The first, and lowest degree of this figure is exemplified, most commonly, by adding an epithet to the object, as "a raging storm," "a deceitful disease," "a cruel disaster," &c. and it raises the style so little that it hardly deserves the name of personification, and might be classed with simple metaphors. On some occasions, however, it adds beauty and sprightliness to an expression. In the second degree of this figure the personification becomes more sensible. It is observed by Dr. Blair, that the genius of our language affords us an advantage in the use of this figure. As with us, no substantive nouns have gender, or are masculine and feminine, except the proper names of male and female creatures; by giving a gender to any inanimate object, or abstract idea, that is, by substituting the personal pronouns, *he* or *she*, in place of the pronoun *it*, we raise the style, and begin to *personify*. In solemn discourse this may be done to good purpose, when speaking of religion or virtue, or our country, or any such object of dignity. An instance of this kind, in which natural religion is beautifully personified, occurs in a sermon of bishop Sherlock's, in which he is comparing our Saviour with Mahomet. "Go," says he, "to your natural religion; lay before her Mahomet, and his disciples, arrayed in armour and blood, riding in triumph over the spoils of thousands who fell by his victorious sword. Shew her the cities which he set in flames, the countries which he ravaged and destroyed, and the miserable distress of all the inhabitants of the earth. When she has viewed him in this scene, carry her into his retirement; shew her the prophet's chamber; his concubines and his wives; and let her hear him allege revelation, and a divine commission to justify his adultery and lust. When she is tired with this prospect, then shew her the blessed Jesus, humble and meek, doing good to all the sons of men. Let her see him in his most retired privacies; let her follow him to the mount, and hear his devotions and supplications to God. Carry her to his table, to view his poor fare; and hear his heavenly discourse. Let her attend him to the tribunal, and consider the patience with which he endured the scoffs and reproaches of his enemies. Lead her to his cross; let her view him in the agony of death, and hear his last prayer for his persecutors: 'Father, forgive them, for they know not what they do!'—When natural religion has thus viewed both, ask her, which is the prophet of God? But her answer we have already had, when she saw part of this scene through the eyes of the centurion, who attended at the cross. By him she spake, and said, "Truly, this man was the son of God." This passage, says Dr. Blair, is more than elegant, it is truly sublime. Personifications of this kind are the life and soul of poetry. They occur frequently in Homer, Shakspeare, and Milton, as well as in other poets. The following personification by Milton, on occasion of Eve's eating the forbidden fruit, is peculiarly striking:

"So saying, her rash hand, in evil hour
Forth reaching to the fruit, she pluck'd, she eat;
Earth felt the wound; and Nature, from her seat
Sighing, through all her works, gave signs of woe,
That all was lost." Book ix. 780.

The third and highest degree of personification is the boldest of all rhetorical figures; it is the expression of strong feeling and passion; and ought never to be attempted,

unless the mind is considerably heated and agitated. Of this figure Milton has given a very fine example, in that moving and tender address, which Eve makes to Paradise, just before she is compelled to leave it:

"Oh! unexpected stroke, worse than of death!
Must I thus leave thee, Paradise! thus leave
Thee, native soil, these happy walks, and shades,
Fit haunt of Gods! where I had hope to spend
Quiet, though sad, the respite of that day,
Which must be mortal to us both. O flowers!
That never will in other climate grow,
My early visitation, and my last,
At ev'n, which I bred up with tender hand,
From your first op'ning buds, and gave you names!
Who now shall rear you to the sun, or rank
Your tribes, and water from th' ambrosial fount?"

B. ii. l. 268.

This is altogether, says Blair, the language of nature, and of female passion.

This excellent writer proposes two great rules for the management of this sort of personification. The first is, never to attempt it, unless when prompted by strong passion, and never to continue it, when the passion begins to flag. The second is, never to personify any object in this way, but such as has some dignity in itself, and can make a proper figure in this elevation to which we raise it.

In prose compositions, this figure requires to be used with still greater moderation and delicacy; for here the imagination is not allowed the same liberty as in poetry, nor can the same assistances be obtained for raising passion to its proper height by the force of numbers, and the glow of style. Nevertheless, addresses to animate objects are not excluded from prose; but they have their place only in the higher species of oratory. This figure has uncommon force and expression, as it is used by Hebrew writers. What can be conceived more apt, more beautiful, or more sublime, than that personification of wisdom, which is so frequently introduced by Solomon? (See Prov. viii. 27—31.) How admirable is that celebrated personification of the divine attributes by the Psalmist? (Ps. lxxxv. 11.) Such also are that in Habakkuk, of the pestilence marching before Jehovah, when he comes to vengeance (Hab. iii. 5.); that in Job, in which destruction and death affirm of wisdom, that her fame only had come to their ears (Job. xxviii. 22.); and that tremendous image, in Isaiah, of Hades, extending her throat, and opening her insatiable and immeasurable jaws. (Is. v. 14.) There is another beautiful species of personification, which originates from a well-known Hebrew idiom; or that form of expression by which the subject, attribute, accident, or effect of any thing is denominated the Son. Isaiah, pronounced by Dr. Lowth to be the sublimest of all poets, furnishes, in one short poem, examples of almost every form of the prosopopœia, and indeed of all that constitutes the sublime in composition. (See Is. xiv. 4—27.) After a critique upon this sublime ode of Isaiah, our learned writer concludes in the following manner: "How forcible is this imagery, how diversified, how sublime! how elevated the diction, the figures, the sentiments!—The Jewish nation, the cedars of Lebanon, the ghosts of departed kings, the Babylonish monarch, the travellers who find his corpse, and last of all Jehovah himself, are the characters which support this beautiful lyric drama. One continued action is kept up, or rather a series of interesting actions are connected together in an incomparable whole: this, indeed, is the principal and distinguished excellence of the sublimer ode, and is displayed in its utmost perfection in this poem of Isaiah, which may be considered as one of the most ancient, and

and certainly the most finished specimen of that species of composition, which has been transmitted to us. The personifications here are frequent, yet not confused; bold, yet not improbable: a free, elevated, and truly divine spirit pervades the whole; nor is there any thing wanting in this ode to defeat its claim to the character of perfect beauty and sublimity. If, indeed, I may be indulged in the free declaration of my own sentiments on this occasion, I do not know a single instance in the whole compass of Greek and Roman poetry, which, in every excellence of composition, can be said to equal, or even to approach it." Blair's Lectures, vol. i. Lowth's Lectures, &c. vol. i.

PROSOR, in *Geography*, a town of Bosnia; 8 miles E. of Kralam.

PROSPECT, a town of America, in Hancock county, and district of Maine; containing 1300 inhabitants.

PROSPECT Harbour, lies on the S. coast of Nova Scotia, with cape Samboe and island eastward, and two leagues N.E. of St. Margaret's bay.

PROSPECT Hill, a town of Fairfax county, in Virginia; 14 miles from Washington.

PROSPECTIVE. See PERSPECTIVE.

PROSPECTIVE Glafs. See OPERA Glafs.

PROSPER, in *Biography*, a saint in the Roman calendar, was a native of Aquitain, or Guienne, and born about the commencement of the fifth century. Some writers have ranked him with the ecclesiastical order, as bishop of Riez, in Provence, and others say, that he held the see of Rhegium in Italy. No ancient writer before the 12th century, has ever spoken of him in any other character than that of a layman, and the ablest critics concur in assigning him that rank. He embraced, in early life, the sentiments of Augustine, and was the occasion of that father writing his treatise concerning predestination and perseverance. After the death of Augustine, he defended his character and doctrine against the attacks made upon them by the priests of Marseilles. In the year 431 he went to Rome, and preferred accusations of heresy against the Gallican clergy who ventured to deviate from the system of his master, and obtained a letter from pope Celestine to the bishops of Gaul, in which the pontiff warmly supported the opinions of Augustine. Sanctioned by the authority of his holiness, Prosper returned home, and redoubled his zeal and industry in opposing the rapid progress which the Pelagian notions were making among his countrymen, both by disputations and conferences, and by his writings. After the year 440, he was sent for to Rome by pope Leo I., who made him his secretary, and principal combatant against the Pelagians in Italy. In the year 443 he was employed by the same pope in a mission against those heretics in Campania. The time of his death is not known, but it is tolerably well ascertained that he was alive beyond the year 460. In Dupin we have a list of his works, and also of others imputed to him which are not genuine. He was possessed of much learning and eloquence, and the style of such pieces as are universally acknowledged to be his, is concise, vigorous, and elegant. Dupin. Moreri. See also Lardner, vol. v. edit. 1788. ch. 134-5.

PROSPEROUS, in *Geography*, a village in the county of Kildare, where extensive cotton-works were erected at a great expence by Capt. Brooke, with parliamentary aid; but, says Mr. Rawson, "he had no knowledge of the business; he committed it to the care of others; of course every thing went to ruin." Prosperous is 18½ miles W. by S. from Dublin.

PROSPHYSIS. See ADHESION.

PROSTANTHERA, in *Botany*, received that name from Labillardiere, in allusion to the spurs of its anthers;

the word being derived from *περσθηξ*, an appendage, and *ανθηρα*, the anther.—Labill. Nov. Holl. v. 2. 18. Brown Prodr. Nov. Holl. v. 1. 508. Ait. Hort. Kew. v. 3. 426.—Class and order, *Didynamia Gymnospermia*. Nat. Ord. *Verticillatae*, Linn. *Labiatae*, Juss.

Ess. Ch. Calyx two-lipped; tube striated; lips undivided, converging when in fruit. Corolla ringent; upper lip cloven half way down; middle segment of the lower largest and two-lobed. Anthers with spurs beneath.

Mr. Brown defines thirteen species of this genus, most of them natives of the country near Port Jackson, New South Wales, or of Van Diemen's island. They are strong smelling shrubs, besprinkled with sessile glands. The leaves are mostly toothed or crenate. Flowers either racemose and terminal, accompanied by deciduous bractes; or axillary and solitary. The flower-stalks always bear a pair of bractes near the extremity. Lower lip of the calyx sometimes abrupt. The spurs of the anthers are different in different species. Their usual number is two, but one of them is sometimes wanting. Each is barbed, or tufted, at the point.

The only species of which we have any knowledge is

P. lasianthos. Villous-flowered Prostanthera. Labill. t. 157. Andr. Repos. t. 661.—Leaves lanceolate, smooth, with tooth-like serratures. Clusters paniced. Corolla hairy on both sides. Longer spur twice the length of the anther. Native of Van Diemen's island, and of New South Wales. Introduced at Kew by A. B. Lambert, esq. in 1808. It flowers in the greenhouse in June and July. Mr. Andrews says it was first raised from seed in 1807, in lord Grenville's beautiful garden at Dropmore, near Marlow. This is a luxuriant smooth shrub, whose leaves are opposite, stalked, two or three inches long. Flowers numerous, elegant, reversed, of a light purple hue, and sweet-scented.

PROSTATE, in *Anatomy*, a glandular body surrounding the urethra just at its commencement from the bladder. See GENERATION.

PROSTATE Gland, *Disease of*, in *Surgery*. The prostate gland, when diseased and enlarged, may produce obstruction of the neck of the bladder, and occasion a difficulty of voiding the urine. This species of retention of urine is much more serious than that proceeding from obstructions in the canal of the urethra, because the means of cure are less within our reach. In the first of these cases, however, it is generally more practicable than in the second, to relieve the patient by an artificial evacuation of the urine, since the catheter admits of being introduced with greater facility.

An enlargement of the prostate gland is far more common in persons advanced in years, than in young subjects.

When the prostate swells, the internal surface of that part of the canal of the urethra which it embraces undergoes no diminution; but, on the contrary, is rather augmented. For the enlarged gland, being situated principally at the sides of the urethra, compresses these together, so that this passage, instead of being round, is flattened, and forms a narrow fissure. Sometimes the gland swells more on one side than the other; and hence the canal which passes through it is rendered oblique.

Besides this effect, caused by the swelling of the lateral portions of the prostate gland, we have to notice another change produced by a small part of this gland, situated quite at the commencement, and on the posterior surface of the urethra. This particular portion of the prostate swells in the direction forward, and projects into the bladder, occasioning a sort of little valve just at the beginning of the urethra. Such an eminence may be observed in the dead body, even when the swelling is not very considerable, if

the surgeon will open the upper part of the bladder, and view the orifice of the urethra from above downward. But, in certain instances, it is alleged to be so considerable, that it projects some inches into the interior of the bladder. Such enlargement increases the bend of the urethra, and produces an impediment to the passage of the catheter, or bougie. Frequently, also, it raises the end of a sound, so as to make it pass above a calculus, which, therefore, is not perceived. It is sometimes, likewise, such an impediment to the entrance of the sound into the bladder, as cannot be surmounted without the utmost difficulty.

When the prostate enlarges, its consistence generally becomes much firmer than what is natural. The effects of such enlargement are very serious; for the sides of the urethra are then pressed together, while the projecting point of the gland in some measure prevents the urine from freely entering this canal, and, in many instances, stops it altogether. Besides, as the firmness of the gland is increased, its suppleness is diminished, so that it does not yield to the impulse of the urine, and little or none of this fluid is evacuated. The symptoms which this disorder produces, resemble those of a retention of urine arising from other causes.

When, in a case of difficulty of making water, the surgeon has had recourse to the catheter, and ascertained that such instrument may be readily introduced, he must next endeavour to learn whether the complaint depends upon the presence of a stone in the bladder. Should circumstances prove, however, that this is not the case, a disease of the prostate gland is to be suspected; especially if the catheter, or bougie, made use of, should meet with a sudden impediment, or pass with great difficulty, when the point of the instrument is near the neck of the bladder.

The attention of the practitioner must then be directed to the prostate, the state of which cannot be ascertained, unless the finger, properly oiled, be passed into the anus, and turned towards the pubes. If a hardness should be felt in the situation of the prostate, extending as far as the finger can reach; if the indurated part should cause a projection, that can be distinctly felt through the coats of the rectum; and if, when the finger is moved about, in order to examine the extent of the swelling, the hardness should be found to reach beyond the length of the finger, the surgeon may be certain that the prostate is considerably enlarged, and that it is the cause of all the patient's complaints.

In cases in which only the sides of the gland are enlarged, a bougie, or catheter, may readily be passed into the bladder; but the point of the gland which projects into this organ, frequently hinders the instrument from actually passing into its cavity. When the size of the prominence here alluded to is considerable, a bougie, or catheter, cannot be got over it without the utmost difficulty, because its apex then forms an angle with the passage. In such a case, it is necessary to be very cautious in the trials to pass an instrument, particularly when a metallic catheter is employed, as otherwise the part causing the obstruction would be injured. Here, certainly, a flexible catheter ought to be preferred; but the point of this sort of instrument may likewise hurt the prominent part of the gland; and should it be forced, its extremity will sooner bend backward than forward, so that it cannot be got into the bladder, but will rather penetrate the substance of the tumour.

Mr. Hunter, from whom we borrow these observations, has recorded an instance of this kind, where a surgeon pushed a catheter quite through the prominent part of the gland, in such a way, that the instrument at length reached the cavity of the bladder, and let out the urine; but the blood which flowed from the wounded part of the prostate passed into the

bladder. A second attempt was made to introduce a catheter; but without success. Mr. Hunter was consulted: he introduced a catheter as far as the part forming the impediment, and having discovered the enlargement of the prostate, he inclined the upper part of the catheter, so as to elevate its other end, and thus succeeded in getting it over the prominence. Unfortunately, the coagulated blood in the bladder stopped up the holes of the instrument, and obliged Mr. Hunter to withdraw it several times, for the purpose of cleaning it. As the same inconvenience continued, he proposed performing a similar operation to lithotomy, in order to discharge the extravasated blood from the bladder; but the patient's death prevented the operation. An examination of the body fully proved the nature of the accident which had given rise to the extravasation.

Instructed by the observation of several facts of this description, Mr. Hunter made it a rule, whenever the urine did not flow out immediately the catheter was introduced, to push the instrument more forward, by inclining its handle so as to raise the other end of it, and get it into the cavity of the bladder. In following this method, Mr. Hunter never failed.

There are no means to be depended upon for dispersing a swelling of the prostate. Cicuta, burnt sponge, and sea bathing, are said to have sometimes answered the purpose. The pilula hydrargyri, with the extract of cicuta, has been recommended. Mr. Home has found suppositories of opium and hemlock, passed up the fundament, not only relieve the irritation, but even lessen the projection of the gland.

Some abscesses and ulcerations of the prostate, which have been occasioned by strictures in the urethra, may be cured by removing the latter disease.

Whoever wishes a more particular account of the diseases of the prostate gland, should consult Baillic's *Morbid Anatomy*; Hunter's *Treatise on the Venereal Disease*; Home on *Strictures*, and on *Diseases of the Prostate Gland*.

PROSTATES, Προστατίς, among the Athenians, was used to signify any patron to whose protection sojourners in that city committed themselves.

He was allowed to demand several services of them, in which, if they failed, or neglected to choose a patron, an action was commenced against them before the polemarchus, and their goods were confiscated. See SOJOURNERS.

PROSTHAPHÆRESIS, formed from *προσθη*, *ante*, *super*, and *αφαίρεσις*, *ademptio*, in *Astronomy*, the difference between the true and mean motion, or true and mean place, of a planet; called also *equation of the orbit*, or *of the centre*, and simply *the equation*.

Prosthaphæresis amounts to the difference between the mean and equated anomaly.

Thus, suppose the circle A L M P N R (*Plate XIX. Astron. fig. 7.*) the orbit of the earth, surrounded by the ecliptic γ, ⊕, ☽, &c. and suppose S the sun, and the earth in R, the mean anomaly will be the arc A P R, or casting away the semicircle, the arc P R, or the angle P C R: and the true anomaly, rejecting the semicircle, will be P S R, which is equal to P C R, and C R S: if then to the mean anomaly we add the angle C R S, we shall have the true anomaly P S R, and the earth's place, in the ecliptic.

And here the angle C L S, or C R S, is called the *prosthaphæresis*, or *equation*, by reason it is sometimes to be added, and sometimes to be subtracted from the mean motion, that we may have the true motion or place of the earth. See EQUATION of the Centre.

PROSTHESIS, Προσθεσις, in *Grammar*, a species of *metaplasm*;

metaplasm; being the prefixing of some letter or syllable at the beginning of a word: as in *gnavus*, *pro navus*.

This is also called *apposition*.

PROSTHESIS, among *Surgeons*, is the filling up of what was before wanting, by the apposition of new matter. Such, *e. gr.* is the filling up fistulous ulcers with new flesh.

PROSTHETA, Προσθητα, from προσθημι, *to apply*, signify in Hippocrates, subditiuous medicines, whether suppositories or pessaries.

PROSTITUTES and PROSTITUTION. See BAWDY-HOUSE, CONCUBINAGE, &c.

PROSTYLE, Προστυλο, formed from προ, *before*, and στυλος, *column*, in the *Ancient Greek Architecture*, a range of columns in the front of a temple.

PROSTYPA, Προστυπα, in the *Sculpture of the Ancients*, images carved in such a manner as to be only half raised above the ground, or plain, on which they are formed. They seem to adhere to it, and have only one side exposed to view. To *prostypha* is opposed *επitypa*.

PROSYLLOGISM, PROSYLLOGISMUS, is used, by some school-writers, for a reason or argument produced to strengthen or confirm one of the premises of a syllogism.

Others define prosyllogism, an argument composed of two syllogisms, so disposed, as that the conclusion of the former is the major or minor of the latter: *e. gr.* Every rational is risible: but every man is rational, therefore, every man is risible: but no ass is risible, therefore no ass is a man.

The major, or the second syllogism, may be omitted or understood; and some even contend, that it ought to be so: so that, on their principle, a prosyllogism, or redundant syllogism, is when two syllogisms are so contained in five propositions, as that the conclusion of the former is the major or minor of the latter.

PROSZOWICE, in *Geography*, a town of Austrian Poland; 16 miles E. of Cracow.

PROTAGORAS, in *Biography*, a celebrated Greek philosopher, was born at Abdera, in Thrace, in the year 619 B.C. He appears to have been of humble origin, and when young was obliged to gain his livelihood by working as a porter. In this capacity he was frequently employed in carrying loads of wood from the adjacent country to Abdera. Democritus met him with one of his usual burdens, and being struck with the neatness with which it was packed, asked if he had done it himself, to which he replied in the affirmative; the philosopher pleased with the ingenuity, desired the youth to follow him, saying he would present him with greater and better objects for the exercise of his talents. The young man readily complied, and Democritus took him home, maintained him at his own expence, and instructed him in the principles of philosophy. After this Protagoras went to Athens, where he opened a school, and acquired great reputation for eloquence, wisdom, and that subtlety in reasoning which was so much admired by the sophists. His public lectures attracted great numbers, who paid him liberally, and he became exceedingly rich. While he was growing in reputation and wealth, he incurred the displeasure of the Athenian state, by advancing doctrines favourable to impiety. Of this he was accused by different persons, and among others by one of his scholars, *viz.* Eualthus, who asserted, that in one of his books he had said, "concerning the gods I am wholly unable to determine whether they have any existence or not; for the weakness of the human understanding, and the shortness of human life, with other causes, prevent us from attaining this knowledge." Similar opinions were also to be met with in some of his other writings, and, on this ac-

count, they were ordered to be collected, and burnt in the market place, while the author himself was banished from Attica. He took refuge in Epirus, where he lived many years. Intending to remove to Sicily, he lost his life by shipwreck on his voyage thither, when he was about 70, or, as others say, 90 years of age. He was author of various pieces upon logic, metaphysics, ethics, and politics, but none of them are extant. He had, unquestionably, a leaning to scepticism, and is said to have taught that contradictory arguments may be advanced upon every subject; that all natural objects are perpetually varying; that the senses convey different reports to different persons, and even to the same person at different times; that nevertheless, we have no other criterion of truth than our own perception, and cannot know that any thing is otherwise than it appears to our own senses, which are the essence of the soul. Adopting the doctrine of Democritus, that the atoms of which bodies are composed are in perpetual motion, Protagoras conceived that external objects are liable to such continual fluctuation, that nothing can certainly be known of them, and hence he concluded that nothing can be pronounced to exist, but that which is at any instant perceived by the senses, and that since these are perpetually varying, things themselves accordingly vary, so that, upon the same evidence, that of the senses, contradictory opinions may be advanced. Enfield's Hist. Phil.

PROTASIS, προτασις, formed from προτινω, *porrigo*, *I hold forth*, in the *Ancient Drama*, the first part of a comic or tragic piece; in which the several persons of the play are shewn; their characters and manners intimated; and the action, which is to make the subject of the piece, proposed and entered upon.

The ancient protasis might go about as far as our two first acts. See ACT.

Where the protasis ended, the epitasis commenced.

PROTATICUS, προτατικός, a person who never appeared but in the protasis, or first part of the play: as *Sofia*, in Terence's *Andria*, &c.

PROTE, in *Geography*, one of the Prince's islands, in the sea of Marmora, about three miles in circumference; healthy and uncultivated. The port is filled up.

PROTEA, in *Botany*, a name well chosen by Linnaeus, to express the great diversity of habit in the species of this genus; at least as he understood it; for other botanists, both before and after him, have much contracted its limits; see PROTEACEÆ. Linn. Gen. ed. 1. 22. Brown Tr. of Linn. Soc. v. 10. 74. Ait. Hort. Kew. v. 1. 188. Gærtn. t. 51. (Leucadendron; Linn. Gen. ed. 6. 46.) See PROTEA; Schreb. 62. Willd. Sp. Pl. v. 1. 506. Mart. Mill. Dict. v. 3. Juss. 78. Lamarck Illustr. t. 53.) Class and order, *Tetrandria Monogynia*. Nat. Ord. *Aggregata*, Linn. *Protea*, or *Proteaceæ*, Juss. Brown.

Gen. Ch. *Common calyx* many-flowered, of numerous, loosely imbricated, permanent scales; the innermost much the longest, expanded, and coloured. *Cor.* of one petal; tube simple, finally splitting longitudinally; limb in four concave segments, three of which cohere laterally. *Nectary* of four glands, alternate with the segments of the corolla, at the base of its tube. *Stam.* Filaments four, very short, inserted into the base of each segment of the limb; anthers oblong, incumbent, in the hollows of the segments. *Pist.* Germen superior, oblong; style awlshaped, permanent, the length of the corolla; stigma undivided, cylindrical, erect, more slender than the style. *Peric.* none. *Seed.* Nut solitary, bristly all over, crowned with the hardened style, of one cell. *Common Receptacle* dotted, clothed with short permanent scales.

Eff. Ch. Corolla separable into two unequal parts; limb four-cleft, with concave segments, bearing the stamens. Stigma cylindrical, more slender than the style. Nut superior, bristly all over, crowned with the permanent style. Common receptacle scaly. Common calyx imbricated, permanent.

Of this genus, as it now stands, Mr. Brown enumerates 39 species, 35 of which have terminal, the rest lateral, heads of flowers. All are natives of Southern Africa, except *P. Abyssinica*, found only by Bruce in the country whose name it bears. Twenty-three are mentioned in Hort. Kew. as known in the British collections. The habit of the whole is shrubby; the height very various. Some few are almost stemless. *Leaves* entire, coriaceous. The *flowers* in many cases are remarkable for their beauty and magnitude, the inner scales of the common *calyx* being sometimes elegantly silky, so as to resemble black velvet. See the following examples.

P. speciosa. Splendid Protea. Linn. Mant. 191. Brown n. 6. Ait. n. 3. Curt. Mag. t. 1183.—*Leaves* obovate-oblong, contracted at the base, smooth as well as the branches. All the scales silky; the inner ones somewhat dilated at the top; the middle ones likewise fringed. Style downy. Segments of the corolla with woolly points. Sent from the Cape of Good Hope, in 1786, by Mr. Masson. It flowers in the greenhouse from March to June. The *stem* forms a large shrub. The *leaves* are obtuse, three or four inches long, and nearly half as broad. *Flowers* as big as a small artichoke, with rose-coloured scales, finely fringed with brown, and bearded with white.

P. mellifera. Honey-bearing Protea. Thunb. Diff. n. 37. Brown n. 16. Ait. n. 9. Curt. Mag. t. 346. (*Leucadendron repens*; Linn. Sp. Pl. 135, z.)—*Leaves* lanceolate, tapering at the base. *Calyx* turbinate; scales smoothish, beardless, viscid. Tips of the corolla woolly. Style smooth, simple at the summit. An inhabitant of the Cape, long known in our gardens and herbariums, distinguished by its very glutinous, rose-coloured, smooth *calyx*, which is almost as large as the foregoing. The *branches* are red and smooth. *Leaves* slightly obovate, or spatulate.

P. mucronifolia. Dagger-leaved Protea. Salisb. Parad. t. 24. Brown n. 20. Ait. n. 12. Curt. Mag. t. 933. Andr. Repof. t. 500.—*Leaves* linear-lanceolate, sharp-pointed; broad at the base. Scales of the calyx lanceolate, pointed, smooth. Stem erect, many-flowered.—Found at the Cape by Mr. Niven. Mellis. Lee and Kennedy are said to have first raised it from seed, about the year 1803. It flowers in autumn. This is much smaller, in every part, than either of the above-mentioned, being a bush, only two or three feet high, with numerous, pungent, rather glaucous, single-ribbed *leaves*, scarcely two inches long. *Flowers* flesh-coloured, with a spreading, taper-pointed *calyx*, expanding above two inches.

P. cordata. Heart-leaved Protea. Thunb. Diff. n. 60. t. 5. Brown n. 36. Ait. n. 20. Andr. Repof. t. 289. (*P. cordifolia*; Curt. Mag. t. 649.)—*Flowers* lateral. *Leaves* roundish-heart-shaped, many-ribbed. Scales of the calyx smooth.—Sent from the Cape, by Mr. Masson, about the year 1790. It blossoms in the spring, and is remarkable for the situation of its dull-crimson rosaceous *flowers*, which grow out of the creeping *stem*, near the *root*, the leafy *branches* rising high above them, in a zigzag nearly upright position. The *leaves* are alternate, distant, nearly sessile, broad, red-edged, of a very rigid coriaceous texture.

P. humilis. Low-flowering Protea. Brown n. 38. Ait. n. 22. (*P. humiflora*; Andr. Repof. t. 532.)—*Flowers* lateral. *Leaves* linear-lanceolate, acute. Receptacle conical,

with acute scales.—Found at the Cape, by Mr. Niven, who sent it to his patron Mr. G. Hibbert, about the year 1802. This is still more singular than the last, for its crowded radical *flowers*, whose colour is a dull-brownish red. The leafy *branches* are numerous, erect, a foot high. *Leaves* numerous, nearly linear, acute, smooth, two or three inches long.

PROTEA, in *Gardening*, contains plants of the ornamental, shrubby, exotic kind, of which the species cultivated are, the cone-bearing protea (*P. conifera*); and the silvery protea (*P. argentea*). But there are several other species that may be cultivated for variety.

Method of Culture.—These plants are increased by seeds, procured from the places of their native growth; which, as soon as obtained, should be sown in pots filled with sandy loam, and placed in a moderate hot-bed; and when the plants are come up, moderate air should be given, or they should be placed in an airy glass case, or towards the front of a greenhouse; and be afterwards managed as other similar exotics of that kind.

They are also sometimes raised by cuttings, in spring and summer, by the assistance of a hot-bed, in the same manner. They should not have much water afterwards, nor be treated in too tender a manner.

They are ornamental among other potted plants.

PROTEACEÆ, in *Botany*, a natural order of plants, the third in Jussieu's sixth class, (where it is termed *Protea*;) and the twenty-sixth of his general system. For other orders of this sixth class, see ELÆAGNI, LAURI, and POLYAGONEÆ. The characters of the order in question are thus given by Jussieu.

Calyx, (rather *corolla*;) in four or five deep divisions, or tubular, with four or five segments, sometimes accompanied below by minute down or scales. *Stamens* equal in number to the divisions of the flower, and inserted into their middle part. *Germs* solitary, superior; style simple; stigma mostly solitary. *Seed* one, either naked or enclosed in a seed-vessel; very rarely the latter is a capsule of one cell, with many seeds. *Albumen* none. *Radicle* inferior. *Stem* shrubby. *Leaves* either alternate, or clustered in a somewhat whorled manner. *Flowers* either distinct, or variously assembled upon a common receptacle, within the imbricated scales of a common calyx. Sometimes the *stamens* and *pisils* are in separate individuals.

The genera in Jussieu are *Protea*, *Banksia*, *Roupala* of Aublet, *Brabeium*, and *Embothrium*.

Mr. R. Brown, in *Transf. of Linn. Soc.* v. 10. p. 15—226, has given a masterly dissertation on this natural order, full of important remarks on the systematic distinctions, as well as on the geography of plants. In this treatise the *Proteaceæ* are divided into no less than 38 genera; *Aulax*, *Leucadendron*, *Petrophila*, *Isopogon*, *Protea*, *Leucospermum*, *Serruria*, *Mimetes*, *Nivenia*, *Sorocephalus*, *Spatalla*, *Adenanthos*, *Guevina*, *Brabeium*, *Persoonia*, *Cenarrhenes*, *Agastachys*, *Symphionema*, *Bellendeua*, *Franklandia*, *Sinisia*, *Conospermum*, *Synaphea*, *Anadenia*, *Grevillea*, *Hakea*, *Lambertia*, *Xylomelum*, *Orites*, *Rhopala*, *Knightia*, *Embothrium*, *Oreocallis*, *Telopea*, *Lomatia*, *Stenocarpus*, *Banksia*, and *Dryandra*. Most of these will be found in their proper places. Our *Dryander* however is properly superseded by that of Mr. Brown, as being not really distinct from *Alcurites* of Forster.

PROTECTION, PROTECTIO, the shelter, defence, authority, and aid, employed by any one in behalf of the helpless or unhappy.

Active protection supposes power, interest, favour, &c. in the person that protects. *Passive* protection, on the contrary,

trary, implies necessity, weakness, and dependence, in the person protected.

PROTECTION is also used for a privilege belonging to ambassadors, members of parliament, &c. by which they and their domestics are secured from arrests, &c. See EMBASSADOR and ARREST.

PROTECTION is sometimes also understood of the person of the protector. Such a cardinal has the protection of France. The protection of Spain is become vacant by the death of such a cardinal.

PROTECTION, in *Law*, in its general sense, denotes that benefit and safety which every subject, denizen, or alien, specially secured, hath by the laws.

PROTECTION, in a more special sense, is used for an exemption or immunity given by the king to a person, to secure him against suits in law, or other vexations, upon reasonable causes moving him thereunto, and for a certain time.

Of this, Fitzherbert makes two kinds: the *first* he calls a protection *cum clausula volumus*; of which he mentions four cases: 1. A protection, *quia profecturus*, for him that is to pass over sea, in the king's service. 2. A protection, *quia moraturus*, for him who is already abroad in the king's service; as an ambassador, &c. 3. A protection for the king's debtor, that he be not sued, or attached, till the king be paid his debt: but by the statute 25 Edw. III. stat. 5. cap. 19. notwithstanding such protection, another creditor may proceed to judgment against him, with a stay of execution till the king's debt be paid; unless such creditor will undertake for the king's debt, and then he shall have execution for both. (See ARREST.) 4. A protection for a person in the king's service beyond sea, or in the marches of Scotland.

The *second* form of protection is *cum clausula nolumus*, which is most commonly granted to a spiritual company, for their immunity from having their cattle taken by the king's ministers. But this may be also granted to a single person, either spiritual or temporal.

Protection extends not to pleas of dower, quare impedit, assize of novel disseisin, darrein presentment, attainments, nor pleas before justices in eyre.

PROTECTION *from Impressing*, is a privilege allowed to certain persons to be exempt from being impressed. This is granted to apprentices to the sea-service, persons employed in the fisheries, coasting trade, &c.

PROTECTION *Island*, in *Geography*, a small island in the gulf of Georgia, at the entrance of Port Discovery. N. lat. 48° 9'. E. long. 237° 20'.

PROTECTOR, a person who undertakes to shelter and defend the weak, helpless, or distressed.

God, and the magistrate, are the protectors of the widow and orphan. Among the heathens, Minerva was esteemed the *protectors* of arts.

Every Catholic nation, and every religious order, has a protector residing at the court of Rome, who is cardinal, and is called the *cardinal* protector.

PROTECTOR is sometimes also used for a regent of a kingdom, made choice of to govern it during the minority of a prince.

Cromwell assumed the title and quality of *lord protector of the commonwealth of England*.

PROTELARII, among the Romans, were the poorer sort of citizens, whose estate did not exceed fifteen hundred pieces of silver. They were distinguished from those who were worth little or nothing; these last being called *capite censi*.

PROTESIS, in *Ancient Music*, a rest or pause, equal to a long syllable; differing from the *limma*, which was the rest for a short time or syllable.

PROTEST, in *Law*, is used for a caution, or call of witness, or an open affirmation, that a person does, either not at all, or but conditionally, yield his consent to any act; or to the proceeding of any judge in a court, in which his jurisdiction is doubtful; or to answer upon his oath farther than by law he is bound.

Any of the lords in parliament have a right to protest their dissent to any bill passed by a majority, with their reasons for such dissent; which protest is entered in form. This privilege is said not to be very ancient: the commons have no right to protest.

PROTEST, in *Commerce*, is a summons made by a notary public to a merchant, banker, or the like, to accept or discharge a bill of exchange drawn on him; after his having refused either to accept or pay the same.

It is called a protest, because it contains a protestation, that the party will return the bill, and even take up money at interest; and charge all costs, damages, carriage, and re-carriage, on the refuser.

There are two kinds of protests, the one for want of acceptance, and the other for want of payment.

The first is to be made by the bearer of the bill, at the time of presenting it, in case the person on whom it is drawn refuses to accept it for the time, or the sum there expressed. See BILL of *Exchange*.

This protest must be made within the regular hours of business, and in sufficient time to have it sent to the holder's correspondent by the very next post after acceptance refused; for if it be not sent by that time, with a letter of advice, the holder will be construed to have discharged the drawer and the other parties entitled to notice; and noting alone is not sufficient; there must absolutely be a protest to render the preceding parties liable. (Bull. N. P. 271. 2 Term Rep. 713.) But in this case the holder is not to send the bill itself to his correspondent: he must retain it, in order to demand payment of the drawee when it becomes due. When the bill becomes due, whether it was accepted or not, it is again to be presented for payment within the days of grace, and if payment be refused, the bill must be protested for non-payment; and the bill itself, together with the protest, sent to the holder's correspondent, unless he shall be ordered by him to retain the bill with the prospect of obtaining its discharge from the acceptor. As this protest on foreign bills must be made on the last day of grace, and immediate notice sent to the parties concerned, it seems established, that such a bill is payable, "on demand made at any time that day" within reasonable hours; and that the acceptor has not the whole day to pay the bill. 4 Term Rep. 170.

Besides the protest for non-acceptance, and for non-payment, there may be also a protest for better security. This is usual when a merchant who has accepted a bill happens to become insolvent, or is publicly reported to have failed in his credit, or absents himself from 'Change, before the bill he has accepted becomes due; or when the holder has any reason to suppose that it will not be paid: in such cases he may cause a notary to demand better security, and on that being refused, make protest for want of it; which protest must also be sent to the parties concerned, by the next post. (Mir. 27. Lord Raym. 743.) In such cases, however, the most general practice is to wait the regular time till the bill becomes due. Where the original bill is lost, and another cannot be had of the drawer, a protest may

PROTEST.

may be made on a copy, especially where the refusal of payment is not for want of the original bill, but merely for another cause. 1 Show. 164.

But if a bill left for acceptance be lost, the person with whom it was left must bind himself to payment, or else the bill may be protested immediately. It is customary, as a precaution against accident or miscarriage, to draw three copies of a foreign bill, and to send them by different posts. They are denominated the *first*, *second*, and *third of exchange*; and when any of them is paid, the rest become void and of no value.

The effect of protest for non-acceptance, or non-payment, is to charge the drawer, or indorsers, not only with the payment of the original sum, but with interest, damages, and expences; which latter consist usually of the exchange, re-exchange, commission, and postage, together with the expences of the protest. (Stra. 649.) The exchange is reckoned according to the course at sight from the place where the protest is made, to the place where the bill is to be paid by the drawer; and if it be not paid there, the re-exchange is then reckoned from the same place to that where the bill is paid, and also double commission. The interest commences from the day when the demand was made. Whenever interest is allowed, and a new action cannot be brought for it, which is the case on bills and notes, the interest is to be calculated up to the time of signing final judgment. 2 Burr. 1086-7. 2 Term. Rep. 52.

The principal difference between foreign and inland bills of exchange at common law seems to have been this. A protest for non-acceptance or non-payment of a foreign bill was, and still is, essentially necessary to charge the drawer on the default of the drawee; nothing, not even the principal sum, could or can at this time be recovered against him without a protest; no other form of notice having been admitted by the custom of merchants as sufficient: but on inland bills, simple notice, within a reasonable time, of the default of the drawee, was held sufficient to charge the drawer, without the solemnity of a protest; the disadvantage arising from thence was this, that notice entitled the holder to receive only the sum in the original bill, which in many cases might be a very serious disadvantage: to remedy this inconvenience in some degree, the stat. 9 & 10 W. III. c. 17. and afterwards the stat. 3 & 4 Anne, c. 9. were passed; the professed intention of which acts was to put inland bills on the same footing as foreign ones; so far as relates to the recovery of damages, interest, and costs, (*i. e.* expences), by means of the protest they have done it; but there are several minute particulars, in which, from an attentive perusal of the acts, it will appear they still differ.

To the constitution of a *BILL of Exchange*, (which see), it is not necessary that the words "value received" should be inserted; and the want of these in a foreign bill, cannot deprive the holder of the benefit of a protest; but that benefit in case of non-payment is not given by the statutes to inland bills, which want these words, and therefore they cannot be protested for non-payment; and the second act provides, that "where these words are wanting, or the value is less than 20*l.* no protest is necessary, either for non-acceptance or non-payment," the safest construction of which seems to be, that inland bills, without the words "value received," or under 20*l.* shall continue as at common law, and shall not be entitled to the privilege of a protest, either for non-acceptance or non-payment.

An inland bill, payable at so many days after "sight," cannot be protested at all, and no inland bill can be pro-

tested, till after the expiration of the three days of grace; notice of which protest is by the statute to be sent within fourteen days after the protest. 4 Term Rep. 170.

There appears to be also another difference subsisting between foreign and inland bills of exchange; for where acceptance and payment both are refused on foreign bills, it seems necessary that there should be a protest for each; but under the stat. 3 & 4 Anne, c. 9, it seems, that one protest for either, on an inland bill, is sufficient. On inland bills, where damages, interest, and costs, (expences), are to be recovered, there is more indulgence in the time allowed for notice of non-payment than where only the principal sum is to be recovered; for when there is no protest for non-payment, presentation for payment must be made so early as the last day of grace, that the holder may give notice of non-payment by the next post. That part of the stat. 3 & 4 Anne, c. 9, which puts notes on the same footing with inland bills, makes no express provision for protesting them for non-payment; but there can be doubt that the practice under which such a protest is frequently made is founded in justice.

After a bill has been protested, it is sometimes accepted by a third person to save the reputation of the drawer, or of an indorser: such an acceptance is called an acceptance "supra protest." The acceptor must then appear in person, with witnesses, before a notary, and declare that he accepts it for the honour of such a person, and subscribe the bill thus:—Accepted, "supra protest," in honour of, &c. The same may happen when the person upon whom a bill was drawn, having doubts about the drawer, protests it, but afterwards accepts it for the honour of one of the indorsers; in this case the bill must be sent to the said indorser without delay. The person for whose honour a bill was accepted must reimburse the acceptor the amount of the bill, commission, and other charges, even though the acceptance should have taken place without his knowledge. If such a person approves of the acceptance, the bill may be paid without any farther protest; but if he should return no answer, or express his disapprobation of the acceptance, the bill must be formally protested for non-payment against him to whom the bill was directed; and on his persisting to refuse payment, the acceptor may safely pay it for his account, as he can recover the amount.

As to several niceties relative to qualified acceptance, and protests under peculiar circumstances, see *Beaves Lex. Merc.* See also 1 *Wils.* 185. *Doug.* 249.

At Paris the protest is to be made within ten days; at Hamburgh within twelve days; at Venice, where all bills are paid in banco, the protest for want of payment is to be made within six days; but then the bank is supposed open, otherwise no protest to be made; however, in 1808, the bank was discontinued, Venice having been incorporated with the kingdom of Italy in 1805: at Rome, protests for want of payment are to be made within fifteen days: at Leghorn, Milan, and Bologna, there is no time fixed; at Amsterdam, they are to be made within six days.

The negotiators of some places, as those of Rome, M. Savary observes, do not look on themselves as obliged to protest in default of payment: but this opinion is contrary to universal custom, and natural reason; since, till after protestation, they have no remedy or resource against the drawer, or indorser, nor any title to be reimbursed.

M. Ricard adds, that bills of exchange drawn from Amsterdam, or Antwerp, or Spain, are to be protested, in default of payment, within fourteen days after they fall due; after which time the bearer stands the risk and chance of the non-protested

protested bill (not the drawer, or indorser), in case the party happens to fail after the said fourteenth day. See *BILL of Exchange*.

PROTEST, in *Sea Language*, is an instrument drawn up in writing, attested before a justice of the peace, by the master and a part of the ship's crew, after the expiration of a voyage, describing the severity of the said voyage, occasioned by tempestuous weather, heavy seas, an insufficient crew, or any other circumstances by which the ship has suffered, or may suffer, either in her hull, masts, rigging, or cargo. It is chiefly intended to shew, that such damages or misfortunes did not happen through any neglect or ill conduct of the master or his officers. Falconer.

The protest of the captain, so long as he is living, is in no case evidence on the one side or the other: the only use that can be made of it is to contradict his testimony, if he varies from it.

PROTESTANDO, in *Law*, is a word made use of to avoid double pleading in actions; it prevents the party that makes it from being concluded by the plea he is about to make, that issue cannot be joined upon it; and it is also a form of pleading, where one will not directly affirm or deny any thing alleged by another or himself. In the first case, it is where a man pleadeth a thing which he dares not affirm, or that he cannot plead for fear of making his plea double; as in title to lands by two descents, the defendant must plead one of them, and put the word *protestando* instead of *dicit*; as to the other, that such a one died seized, &c. and in the last case, when one is to answer to two matters, and by the law he ought but to plead to one; then in the beginning of the plea he may say *protestando*, that such matter is not true, and add to his plea *pro placito dicit*; and so he may take issue upon the other part of the matter. Plowd. 276. Finch 359.

PROTESTANT, a name first given in Germany to those who adhered to the doctrine of Luther; because, in 1529, they *protested* against a decree of the emperor Charles V. and the diet of Spire; and declared, that they appealed to a general council.

In a former diet, held at Spire in 1526, it was unanimously agreed to present a solemn address to the emperor, beseeching him to assemble, without delay, a free and a general council; and it was also agreed, that in the mean time, the princes and states of the empire should, in their respective dominions, be at liberty to manage ecclesiastical matters in the manner they should think the most expedient, yet so as to be able to give to God and to the emperor an account of their administration, when it should be demanded of them. This decree was considered by the adversaries of the Reformation as almost equivalent to a toleration of Luther's opinions, and therefore, as soon as the emperor had concluded a treaty of peace with Clement VII., who now sat in the papal chair, he assembled the new diet at Spire in 1529; where the power which had been granted by the former diet to every prince, of managing ecclesiastical matters as they thought proper, until the meeting of a general council, was revoked by a majority of votes; and every change was declared unlawful, that should be introduced into the doctrine, discipline, or worship of the established religion, before the determination of the approaching council was known. Against this decree, the elector of Saxony, the marquis of Brandenburg, the landgrave of Hesse, the dukes of Lunenburg, the prince of Anhalt, together with the deputies of fourteen imperial or free cities, entered a solemn protest.

The name has been since also given to those who adhere to the sentiments of Calvin; and is now become a com-

mon denomination applied indiscriminately to all the sects, of whatever denomination, which have revolted from the Roman see.

PROTESTANTS, *French*. See HUGUENOTS.

PROTESTANT *Dissenters*. See DISSENTERS, and NON-CONFORMISTS.

PROTESTANT *Succession*. See *Right of Crown*.

PROTESTATION, in *Law*, a solemn declaration made by some judiciary act, or proceeding against any oppression, violence, or injustice; or against the legality of a sentence, judgment, decree, or other procedure; importing, that the party is determined to oppose it at the proper time, &c. See PROTEST.

Protestation is defined by justice Walsh, a defence, or safeguard, to the party that makes it, from being concluded by the act he is about to do; so that issue cannot be joined upon it.

Protestation is defined by Plowden, a form of pleading, when one does not either directly affirm or deny any thing alleged by another, or which he himself alleges. Plowd. fol. 276. See PROTESTANDO.

PROTEUS, in *Mythology*, the son of Neptune and Phœnice, or Oceanus and Tethys, who was reputed one of the gods of the sea, and supposed capable of foretelling future events, and of transforming himself into any shape at pleasure.

According to Diodorus Siculus, he was king of Egypt, and, after the manner of their kings, he sometimes used a lion, and sometimes a bull for his crest. He is said to have reigned two hundred and forty years after Moses, and by his distinguished knowledge of astronomy to be able to predict the revolutions of the planets.

No character in mythology is more celebrated than this sea-god, and the two greatest poets of antiquity, Homer (*Odyss. lib. iv.*) and Virgil (*Georg. 4.*), have vied with each other in delineating it. In order to separate the truth of history from fiction, we should recollect and compare the accounts which ancient writers, such as Homer, Herodotus, Diodorus Siculus, Clemens Alexandrinus, Lycophron, and several others, have given us of Proteus. All agree, that about the time of the Trojan war, Proteus was a king of Egypt, who kept his court at Memphis. According to Herodotus, he was the successor of Pheron, and had a temple at Memphis, which was splendid and magnificently adorned: and in this temple was a chapel dedicated to Venus. Diodorus Siculus calls him Cetes. The circumstance which seems to have given rise to the metamorphoses of Homer and Virgil seems to have been this: Proteus was a wise and eloquent prince, and the precaution which led him to avoid every danger answered the purpose of a prophetic spirit, which is ascribed to him. Homer and Virgil, by the qualities which they attribute to him, seem to be giving an allegorical description of a king, wise and provident, artful and insinuating, and not of a sea-monster, or a camæleon, that changed his form and figure. Nothing is more usual in the poets, and even in scripture, than those symbolical descriptions that figure a character under obscure terms; accordingly Proteus is denominated the son of Neptune, because he was powerful at sea, and master of Carpathia, an island near Egypt, and hence he was afterwards styled a sea-god; and that he himself was a native of Pallene, in Thessaly.

Some authors allege, that Proteus was a skilful orator, who could easily prevail with those who conversed with him, to alter their sentiments. Heraclides of Pontus says, that the fable of Proteus comprehends the mystery of the formation of the world, and that his changes were designed

to teach us, that matter was capable of receiving all sorts of forms, and that Eidotea, who advises to bind her father, is divine Providence, which fixes this matter to certain subjects. According to Bryant, he was the patriarch Noah.

PROTEUS, in *Natural History*, an animalcule discovered by Baker in the slime-like matter taken from the side of a glass jar, in which small fishes, water-snails, and other such creatures, had been kept alive for two or three months, by giving them frequently fresh water. In substance and colour it resembles a snail: its shape is somewhat elliptical, but pointed at one end, whilst from the other a long, slender, and finely proportioned neck stretched itself out, and was terminated with a kind of head. Mr. Baker has described and given a figure of this microscopic animal, and denominated it Proteus from its various sudden transformations. Employment for the Microscope, vol. ii. c. 5.

PROTHESIS, *προθεσις*, derived from *προτιθημι*, *I expose to view*, among the Greeks, the ceremony of laying the dead near the door till the time of their interment, with their feet outwards; on which account the Romans called them *positi*.

PROTHESIS, a little altar in the Greek churches, on which a ceremony is performed, called by the name *προθεσις*.

On this altar the priest, with the other ministers, prepare every thing necessary to the celebration of mass, *viz.* the bread, wine, &c. After which they go in procession from this to the great altar to begin mass; carrying with them the species thus prepared.

PROTHONOTARY, PROTHONOTARIUS, *Protonotary*, a term properly signifying *first notary*; and which was anciently the title of the principal notaries of the emperors of Constantinople.

With us prothonotary, called also *preignotary*, is used for an officer in the courts of king's bench and common pleas; the latter of which has three, the former one. See COURT, &c.

PROTHONOTARY of the king's bench records all actions civil, sued in that court; as the clerk of the crown-office doth in all criminal causes.

PROTHONOTARIES of the common pleas enter and inroll all declarations, pleadings, assizes, judgments, and actions: they also make out all judicial writs, as the venire facias, after issue joined; except habeas corpus, and distringas jurator, for which there is a separate office; writs of execution and seisin, of superfeudas, of privilege, &c.; they inroll all recognizances acknowledged in that court, all common recoveries, make exemplifications of records, &c.

PROTHONOTARY, or *Protonotary*, is also an officer in the court of Rome, who has a degree of pre-eminence over the other notaries.

There is a college of twelve prothonotaries, called *participantes*; because partaking in the fees of the expeditions in chancery.

They are ranked among the number of prelates, and wear the violet rochet, the hat, &c. They assist at all grand ceremonies, and have a place in the pope's chapel.

Their office is to dispatch the acts in grand causes, which the simple apostolical notaries dispatch in lesser causes: they may create apostolical notaries and doctors, to officiate out of the city.

Those out of the college have none of the privileges of the others, except the habit.

The prothonotaries were first established at Rome by pope Clement I. with design to write the lives of the martyrs.

PROTHYRIS, in the *Ancient Architecture*, is some-

times used for a quoin, or corner of a wall; otherwise called *anco*. See CONSOLE.

Sometimes, also, for a cross-beam, or over-thwart rafter.

PROTHYRIS is also used, by Vignola, for a particular sort of key of an arch: an instance of which we have in his Ionic order, consisting of a roll of water-leaves, between two reglets and two fillets, crowned with a Doric cymatium; its figure being much like that of a modillion.

PROTHYRUM, *προθυρον*, a porch at the outer door of a house or portal.

PROTIPULA, in *Entomology*, a name given to a species of fly resembling the tipula, or long-legs, in many respects; but differing in regard to the essential character, which, in the tipula, is the having two beards growing on the anterior part of the head, and occasionally falling over the mouth, and closing its aperture; these the protipula wants.

PROTIWIN, in *Geography*, a town of Bohemia, in the circle of Prachatitz; four miles N. of Wodnian.

PROTO, formed from *πρωτο*, *first*, a word used in composition with divers terms in our language, to express a relation in priority; as in proto-martyr, proto-type, &c.

PROTO-Canonical. See DEUTERO-Canonical.

PROTOCOLLUM, *πρωτοκολλον*, a term used in the ancient jurisprudence for the first leaf of a book, in which was the mark of the paper, or parchment.

It was even sometimes used for the mark itself; which was usually in the margin, but sometimes at the top of the page.

The forty-fourth Novel of Justinian forbids cutting the protocollum of charters, which shew the year in which the paper or parchment was made, and the officer commissioned for the delivery of them; by means of which frauds were frequently detected.

PROTOCOLLUM was also used for the first minute, draught, or summary, of an act to be passed, which the notary drew up, in short, in little table-books, to be afterwards enlarged at leisure.

PROTOFORESTARIUS was he whom our ancient kings made chief of Windsor forest, to take cognizance of all causes of death or mayhem there; after the manner of a lord chief justice in eyre.

PROTOGALA, the term used by the ancients for what we call *beeflings*, the first milk of a cow or other animal after her having brought forth young.

PROTOGONUS, in *Mythology*, the first man in the cosmogony of the Phœnicians, whose wife was Eon; and of their posterity Sanchoniathon has given an account. According to Bryant, in his Analysis of Mythology, Protogonus was designed to represent the great patriarch Noah; who is described in the Orphic Hymn. 5, as the first of men; of a twofold state or nature, who wandered at large under the whole heavens, inclosed in an ovicular machine, (whence he was termed *Ωογενης*, ovo genitus,) and who was (hieroglyphically) depicted with golden wings. The same was the parent of all mankind, who dispelled the mist and darkness with which every thing had been obscured.

PROTO-MARTYR, compounded of *πρωτο*, *first*, and *μαρτυρ*, *witness*, the *first martyr*, or witness, who suffered death in testimony of the truth; as Abel, improperly reckoned so by some, in the Old Testament, and St. Stephen in the New.

PROTONOTARY. See PROTHONOTARY.

PROTOPASCHITÆ, *προτοπασχισται*, in *Church History*, heretics, who, after the manner of the Jews, celebrated the feast of Easter with unleavened bread. They were likewise called Sabbatiani.

PROTOPLAST, PROTOPLASTUS, a title sometimes given to our first father Adam, from the Greek *πρωτοπλαστος*, q. d. *first formed*.

PROTOS, Gr., the name of the first tone or ecclesiastical mode, in the Ambrosian chant.

PROTOTYPE, *πρωτοτυπος*, the original, or model, by which a thing is formed.

It is chiefly used for the patterns of things to be engraven, moulded, or cast.

PROTOTYPON, *πρωτοτυπον*, in *Grammar*, is sometimes used for a primitive, or original word.

PROTRACTING, or PROTRACTION, in *Surveying*, the act of plotting, or laying down, the dimensions taken in the field, by means of a protractor, &c.

Protracting makes one part of surveying.

PROTRACTING-Pin, a mathematical instrument, or rather an appendage of an instrument called a protractor.

The protracting-pin is a fine needle, fitted into a handle, used to prick off degrees and minutes from the limb of the protractor.

PROTRACTOR, a name of an instrument used in *Surgery*, to draw out any foreign or disagreeable bodies from a wound or ulcer, in like manner as the forceps.

PROTRACTOR is also an instrument used in *Surveying*, by which the angles taken in the field with a theodolite, circumferentor, or the like, are plotted, or laid down, on paper.

This protractor consists of a semicircular limb, A D B (*Platc I. Surveying, fig. 1.*) of brass, silver, horn, or the like, divided into 180° , and subtended by a diameter B A, in the middle of which is a little notch, or lip, C, called the *centre of the protractor*.

For the convenience of reckoning both ways, the degrees are numbered from the left hand towards the right, and from the right hand towards the left.

But this instrument is made much more commodious by transferring the divisions on the same circumference to the edge of a ruler, whose side E F is parallel to A B, which is easily done by laying a ruler on the centre C, and the several divisions on the semicircumference A D B, and marking the intersections of that ruler on the line E F: so that a ruler with these divisions marked on three of its sides, and numbered both ways, as in the protractor, (the fourth or blank side representing the diameter of the circle), is of the same use as a protractor; and much better adapted to a case.

On the limb of the protractor are sometimes also placed numbers, denoting the angles at the centres of regular polygons: thus against the number 5, denoting the sides of a pentagon, is found 72, the angle at the centre of a pentagon.

PROTRACTOR, *Use of the*: 1. *To lay down an angle of any given quantity, or number of degrees, e. gr. of fifty degrees, at any point, and with any given line, e. gr.* Lay the centre of the protractor on the given point, and the diameter of the protractor on the given line: make a mark against the given degree 50, on the limb of the protractor; through which, from the given point, draw a line: this gives the angle required.

2. *To find the quantity of a given angle.*—Lay the centre of the protractor on the point of the angle, and the diameter on one of the lines forming it. The degree of the limb cut by the other line, *viz.* 50, is the number of degrees of the angle required.

3. *To inscribe any given regular polygon, e. gr. a pentagon, in a circle.*—Lay the centre and diameter of the protractor on the centre and diameter of the circle, and make a dot

against the number of degrees of the angle at the centre, *viz.* 72. Through this dot and the centre of the circle draw a line, cutting the circumference of the circle. To the point of intersection, from the point where the diameter cuts the circumference, draw a right line; this line will be a side of the pentagon, which, being taken in the compasses, and set off as often as it will go in the circumference, will give points, which, being connected by lines, will form the pentagon required. See POLYGON.

4. *To describe any regular polygon, e. gr. an octagon, on a given line.*—Subtract the angle at the centre, which the protractor gives, *e. gr.* 45° from 180 , the remainder 135 degrees is the angle included between two sides of the octagon, one-half of which is $67\frac{1}{2}$. Applying then the diameter of the protractor over the given line, with the centre over one extreme; make a dot against $67\frac{1}{2}$, to which from the centre draw a line: apply the protractor to the other end of the line, so as the centre be over the extreme, and there set off another angle of $67\frac{1}{2}^{\circ}$.

From the point where the two lines thus drawn intersect, as a centre, describe a circle with the interval of the given line.

The given line will be one side of the octagon; which, being set off as often as it will go in the circumference thus drawn, will give points, which, being connected, will form the octagon required.

PROTRACTOR, *Improved*, is an instrument much like the former, only furnished with a little more apparatus, by which we are enabled to set off an angle to a minute; which is impracticable on the other.

The chief addition is an index fitted on the centre, and moveable on it, so as to play freely and steadily over the limb. Beyond the limb the index is divided, on both edges, into sixty equal parts of the portions of circles, intercepted by two other right lines drawn from the centre, so that each makes an angle of one degree with lines drawn to the assumed points from the centre.

To set off an angle of any number of degrees and minutes with this protractor, move the index, so that one of the lines drawn on the limb, from one of the fore-mentioned points, may fall upon the number of degrees given; and prick off as many of the equal parts on the proper edge of the index as there are minutes given: thus, drawing a line from the centre to that point so pricked off, you have an angle with the diameter of the protractor, of the proposed number of degrees and minutes.

Indeed it may be of good use to lay down an angle to a minute, when we are able to take it to a minute: but, till we have better needles, and juster theodolites, than are yet made, the old protractor may serve very well.

PROTRUSORIS *Ordo Exterior*, in *Anatomy*, a name given by Santorini to certain fasciculi of the great zygomatic muscle, running under the fleshy part of the lower lip. See LIPS.

PROTRUSORIS *Interior Ordo*, a name given by Santorini to a muscle of the face, called by Albinus orbicularis oris; and by Cowper and Douglas constrictor labiorum and sphincter labiorum. See LIPS.

PROTRYGIA, *Προτρυγία*, in *Antiquity*, a festival in honour of Neptune, and of Bacchus, furnished *πρωτρυγης*, or *πρωτρυγας*, *απο της τευ ος*, i. e. *from new wine*.

PROTTES, in *Geography*, a town of Austria; 10 miles S. of Zittersdorf.

PROTUBERANCE, PROTUBERANTIA, in *Anatomy*, denotes an eminence, whether natural, or preternatural, that projects or advances out beyond the rest.

The orbicular protuberances of the third ventricle of the

brain are called *nates*; and the apophyses of the orbicular protuberances are called *testes*.

The annular protuberance is the process of the medulla oblongata, in form of a ring; whence its name, first given it by Willis.

PROTZEN, in *Geography*, a town of Bohemia, in the circle of Leitmeritz; 22 miles N. of Prague.

PROVADSCIK, a town of European Turkey, in Bulgaria; 46 miles W. of Varna.

PROVAT, or PRUAT, a town of European Turkey, in Bulgaria; 16 miles N.W. of Varna.

PROVEDITOR, PROVEDITOUR, or *Proveditore*, an officer in several parts of Italy, particularly at Venice.

There are various kinds of proveditors in Venice; as proveditor of the commons, who is nearly the same with the ædile among the Romans, consul in Languedoc, and eschevin in other cities. Of these proveditors there are three.

The *proveditores alle ragioni vecchie, alla biave, alla giustizia*, &c. have the direction of matters relating to policy, throughout the signiory.

PROVEDITOR *General of the Sea*, is an officer whose authority extends over the whole fleet, when the captain-general is absent. He has, particularly, the disposal of the cash; and pays the seamen, and the soldiers.

The captain-general and proveditor are mutually spies over one another: though the proveditor be inferior to the general, yet is the power so divided, that one has authority without strength, the other strength without authority.

PROVEN, or PROVENDE, in *Geography*, a town of France, in the department of the Lys; 9 miles W. of Ypres.

PROVENCA *a Velha*, a town of Portugal, in the province of Beira; five miles N.W. of Idanha à Velha.

PROVENÇAL POETS, in the *History of Literature*, a name given to certain professions of men who sprang up in Provence about the end of the tenth century, comprehending those that were called Troubadours, or Trouverres, Jongleurs, Cantadours, Violars, and Musars, in whom the faculties both of music and poetry seemed to be united. The first of these were so denominated from the art which they professed of inventing or finding out, as well subjects and sentiments as rhymes, constituting what at that time was deemed poetry. The jongleurs are supposed to have taken their name from some musical instrument, on which they played, probably of a name resembling in its sound that by which their profession was distinguished: whence spring the jugglers, *quasi joculariores*, as Menage conjectures, who went about singing their verses in courts and the houses of noblemen, with a viol or harp, or other instrument, and were dressed in a peculiar habit, for the sake of entertaining in a burlesque manner their protectors and patrons. M. de Ravaliere derives jongleur from *ongle*, a nail, whence *ongleur*, a trimmer of instruments with the nails. This etymology, says Dr. Burney (*Hist. Mus.* vol. ii. p. 267.), is probable; as the lyre, cithara, harp, lute, and guitar, the most ancient stringed instruments, have at all times been played with the nails and ends of the fingers. The cantadours, called also chanteres, were singers of songs and ballads, as were also the musari; and the violars were players on the viol.

All these arts were comprehended, in the French language, under the general denomination of menestruadic, menestrandise, and jonglerie.

The Provençal poets were not only the inventors and composers of metrical romances, songs, ballads, and rhymes, to so great a number, and of such a kind, as to raise an emulation in most countries of Europe to imitate them; but,

if we may credit the Italian writers, the best poets of Italy, namely, Petrarch and Dante, owed much of their excellence to their imitation of the Provençals: and it is also said that the greater part of the novels of Boccace are taken from Provençal or ancient French romances. The learned Dr. Percy, in his Essay on the ancient English Minstrels, has given a very curious and satisfactory account of these fathers of modern poetry and music; and although he agrees that the several professions above enumerated were included under the general name of minstrel, he has, in the notes to that Essay, p. 42. with great accuracy assigned to each his distinct and peculiar office. Of the ancient writers of romance, a history is extant in the lives of the Provençal poets, written in French by J. Nostradamus, compiled and published at Lyons in 1575; but a much more satisfactory account of them is contained in the translation of this work into Italian, with many additions, by Gio. Mario de Crescimbeni, and published, in 1710, under the title of "Commentari Intorno all' Istoria della Volgare Poesia." See Hawkins's *Hist. of Music*, vol. ii. p. 44, &c.

PROVENCE, in *Geography*, the name, before the revolution, of one of the richest provinces of France, bounded on the E. by Piedmont, on the S. by the Mediterranean, on the W. by the Venaissin and the Rhône, which separates it from Languedoc. It produces wine, corn, and oil; its capital was Marseilles. It now comprehends the departments of the Var, the Mouths of the Rhône, and the Lower Alps.

PROVEND, or PROVENDER, is properly a sort of vessel containing the measure of grains daily given to a horse, or other beast of labour, for his subsistence.

Some derive the word from the Latin *præbenda*, or *prebend*.

Hence provender is also become a general name for all food of cattle. In monasteries, when the religious go to meals, they are said to go to provend.

PROVENZALE, MARCELLO DA CENTO, in *Biography*, born in 1575, was a disciple of Paolo Rosetti, and became very eminent as a painter of history and portrait. But his superior merit consisted in mosaic, which he executed with uncommon skill.

In the palace of cardinal Borghese, at Rome, there is a portrait of Paul V. in mosaic, by this master. It is wrought in imitation of the mosaic of the ancients; but is such an imitation as excels all that can be seen of the originals. The face alone consists of more than two millions of pieces, many of them being of no larger dimensions than a grain of sand, and it is most deservedly esteemed one of the greatest curiosities of Rome.

The first altar piece in mosaic for the Basilica of St. Peter, was wrought by Giambatista Calandra of Verelli, under the pontificate of Urban VIII. It was a St. Michael, from a design of Cesare d'Arpino: a considerable progress was then already made towards the modern style of art, which since has been carried to a still higher degree by the two Cristofori, Fabio, and T. Paolo his son, who made the mosaics of the St. Petronilla, from the original of Guercino; the Communion of St. Jerome, from Dominichino; and the baptism of Christ, from Maratta. Fuseli's Pilkington.

PROVER, in *Law*, *probator*, an approver, or person who confessing felony, appeals, or accuses another of the same. He is thus called because he must prove what he alleges in his appeal; which proof is either by battle, or by the country, at his election who is appealed.

In 39 Edw. III. coram rege, rot. 97. Suff. a man became an *approver*, and appealed five, who all joined battle with him, and he overcame them all: four of them were accordingly

cordingly hanged, and the fifth pleaded he was a clerk. The prover was pardoned. See APPROVER.

PROVERB, among *Jewellers*, an instrument by which they examine the size and depth of diamonds. It is a spring in shape not unlike a pair of caliber compasses, kept at the proper distance by means of a spring.

PROVERB, *Proverbium*, is defined, by Camden, a concise, witty, and wise speech, grounded upon long experience; and containing, for the most part, some useful caveat.

Such are, *A close mouth catches no flies. A high building, a low foundation. A carrion kite will never be a good hawk. A short horse is soon curried. A man may love his house well, though he ride not on the ridge. A false knave needs no broker. Better to spare at brim, than at bottom, &c.*

The late learned bishop Lowth has furnished us with many excellent remarks on the ancient method of instruction by parables or proverbs. It was adopted in very remote antiquity, by those who, by genius and reflection, exercised in the school of experience, had accumulated a stock of knowledge, and who were desirous of reducing it into the most compendious form, and comprising, in a few maxims, those observations which they apprehended most essential to human happiness. This mode of instruction was peculiarly adapted to a rude stage of society, and more likely to produce effect than any other; for it professed not to dispute, but to command; not to persuade, but to compel; it conducted men not by a circuit of argument, but led them immediately to the approbation and practice of integrity and virtue. In order to render it more pleasing, as well as powerful, the instructors of mankind added to their precepts the graces of harmony, and illuminated them with metaphors, comparisons, allusions, and the other embellishments of style. Among the Hebrews it prevailed much, and continued to the latest ages of their literature; and obtained among them the appellation of "Mashalim" (or Parables,) partly because it consisted of parables, properly so called, (see PARABLE,) and partly because it possessed uncommon force and authority over the minds of the auditors. Solomon, whose book of Proverbs (see the next article) is an admirable specimen of this didactic poetry, has explained the principal excellencies of this form of composition; exhibiting both a complete definition of a parable or proverb, and a very happy instance of what he describes:

"Apples of gold in a net-work of silver,
Is a word seasonably spoken." Prov. xxv. 11.

Thus insinuating, that grave and profound sentiments are to be set off by a smooth and well-turned phraseology, as the appearance of the most beautiful and exquisitely coloured print, or the imitation of it perhaps in the most precious metals, is improved by the circumstance of shining, as through a veil, through the ramifications of a silver vessel exquisitely carved.

The first excellence of a proverb is brevity; without which it can neither retain its name nor nature. The discriminating sentiment should be expressed in few words, or otherwise the sentence that conveys it becomes a declamation or harangue, and can no longer be regarded as a proverb; and thus force itself upon the mind by a single effort; and not by a tedious process. Accordingly, the language must be strong and condensed. Horace insists upon this as one of the express rules of didactic poetry, assigning the reason on which it is founded:

"Short be the precept, which with ease is gain'd
By docile minds, and faithfully retain'd."

Art of Poetry, v. 455.

Solomon expresses the same sentiment in his own, parabolic, manner:

"The words of the wife are like goads,
And like nails that are firmly fix'd." Eccl. xii. 11.

That is, they instantaneously stimulate or affect the mind; they penetrate deeply, and are firmly retained. Even the obscurity that is generally attendant on excessive brevity has its use, in keeping alive the attention, and exercising the genius by the labour of the investigation; and also in the gratification accompanying knowledge, gained in some degree by our own efforts.

Another quality essential to a parable or proverb is elegance, which is inconsistent neither with brevity, nor with some degree of obscurity. Elegance in this connection respects the sentiment, the imagery, and the diction. Those proverbs, which are the plainest, most obvious, and simple, which contain nothing remarkable either in sentiment or style, are not to be accounted as destitute of their peculiar elegance, if they possess only brevity, and that neat, compact form, and roundness of period, which are of themselves sufficient to constitute a parable. See 1 Sam. xxiv. 13. Prov. x. 12.

PROVERBS, in *Scripture History*, is the name of one of the canonical books of the Old Testament, containing a collection of moral sentences and maxims, adapted to the regulation of the conduct in every period and condition of life, and ascribed to Solomon; though some writers, among whom is Grotius, have expressed their doubts, whether Solomon was the author of this book.

This work, which affords a specimen of didactic poetry, belonging to the first rank of this kind of writing, consists of two parts. The first, serving as a proem or exordium, includes the nine first chapters; and is varied, elegant, sublime, and truly poetical; the order of the subject is in general excellently preserved, and the parts are very aptly connected among themselves. It is embellished with many beautiful descriptions and personifications; the diction is polished, and abounds with all the ornaments of poetry; in so much, that it scarcely yields in elegance and splendour to any of the sacred writings. The other part, which extends from the beginning of the tenth chapter to the end of the book, consists almost entirely of detached parables or maxims, which possess little of the sublime or poetical, except a certain energetic and concise turn of expression.

PROVEZENDE, in *Geography*, a town of Portugal, in the province of Tras os Montes; 10 miles N.E. of Lamego.

PROVIDEN, a small island near the N. coast of Ceylon; 28 miles S.S.E. of Trincomaly.

PROVIDENCE, PROVIDENTIA, the conduct and direction of the several parts of the universe, by a superior intelligent Being.

The notion of a providence is very ancient, even in the heathen theology; we find Thales mentions it. It is founded on this supposition, that the Creator has not so fixed and ascertained the laws of nature, nor so connected the chain of second causes, as to leave the world to itself; but that he still preserves the reins in his own hands, and occasionally intervenes, alters, restrains, enforces, suspends, &c. those laws, by a particular providence.

Some use the word providence in a more general sense, signifying by it that power or action by which the several parts of the creation are ordinarily directed.

Thus Damascenus defines providence to be that divine will by which all things are ordered and directed to the proper end. Which notion of providence supposes no laws at all fixed by the Author of nature at the creation; but that

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that he reserved it at large, to be governed by himself occasionally.

The ancients called providence by the names of *fate, fortune, nature, destiny, necessity, &c.*

The ancient Egyptians seem to have been the first who had the notion of a divine providence. Arnobius observes they reasoned thus. "Providence is so essential to a prince, that without it he cannot be, nor even be called, a prince; and the more august a prince is, the more perfect ought his providence to be. Since, then, God is the greatest and most august of all princes, to him must belong the most perfect providence."

The Epicureans deny any divine providence, as thinking it inconsistent with the ease and repose of the divine nature, to meddle at all with human affairs.

Others deny the existence of a providence, from the seemingly unjust distribution of good and evil; which appear to fall indiscriminately on the just and unjust.

Simplicius argues thus for a providence: if God do not look to the affairs of the world, it is either because he cannot, or will not; but the first is absurd, since, to govern cannot be difficult where to create was easy; and the latter is both absurd and blasphemous.

In Plato's 10th Dialogue of Laws, he teaches excellently that (since what is self-moving is, by its nature, *before* that which moves only in consequence of being moved) *mind* must be *prior to matter*, and the cause of all its modifications and changes; and that, therefore, there is an universal mind possessed of all perfection, which produced and which actuates all things — εκ γε των ειρημενων ουδ' οσιον αλλως λεγειν η πασαν αριστην εχουσαν ψυχην περιαιρειν παντα. After this he shews that the Deity exercises a particular providence over the world, taking care of small no less than great things. Ως επιμελεις σμικρων επι θεοι, ουχ ηττου η των μεγαθει διαφεροντων. In proving this he observes, "that a superior nature of such excellence as the Divine, which hears, sees, and knows all things, cannot, in any instance, be subject to negligence or sloth; that the meanest and the greatest parts of the world are all equally his work or possession; that great things cannot be rightly taken care of without taking care of small; and that, in all cases, the more able and perfect any artist is, (as a physician, an architect, or the ruler of the state,) the more his skill and care appear in little as well as great things. Let us not then (says he) conceive of God as worse than even mortal artists." Ουδε γαρ ανευ σμικρων της μεγαλης θασιν οι λιθολογοι λιθους ευ κειθαι — μη τον γε θεοι αξιωσωμεν ποτε θνητων δημιουργων φαυλοτεροι: οι τα προσηκοντα αυτοις εργα οσω περ' αν αμεινους ωσι τοσω ακριβεστερα και τελωτερα μια τεχνη σμικρα και μεγαλα απεργαζονται.

The term providence, in its primary signification, simply denotes *fore-sight*; and if we allow the existence of a Supreme Being who formed the universe at first, we must necessarily allow, that he has a perfect foresight of every event, which, at any time, takes place in the natural or moral world. Matter can have no motion, nor spirit any energy, but what is derived from him; nor can he be ignorant of the effects which they will, either separately or conjointly, produce.

A common mechanic has knowledge of the work of his own hands; when he puts the machine, which he has made, in motion, he foresees how long it will go, and what will be the state and position of its several parts at any particular point of time: or, if he is not perfectly able to do this, it is because he is not perfectly acquainted with all the powers of the materials which he has used in its construction; they are not of his making, and they may therefore have qualities which he does not understand, and consequently

cannot regulate. But in the immense machine of the universe there is nothing except that which God has made; all the power and properties, relations and dependencies, which created things have, they have both in kind and degree from him. Nothing, therefore, it should seem, can come to pass at any time, or in any part of the universe, which its incomprehensible Architect did not, from the moment his Almighty Fiat called it into existence, clearly foresee.

The providence of God is implied in his very existence as an intelligent creator: and it imports not only an abstract foresight of all possible events, but such a predisposition of causes and effects, such an adjustment of means and ends, as seems to us to exclude that contingency of human actions, with which, as expectants of positive rewards and punishments in another world, we firmly believe it to be altogether consistent.

By providence we may understand, not merely foresight, but an uniform and constant operation of God subsequent to the act of creation. Thus, in every machine formed by human ingenuity, there is a necessity for the action of some extraneous power to put the machine in motion; a proper construction and disposition of parts not being sufficient to effect the end: there must be a spring, or a weight, or an impulse of air or water, or some substance or other, on which the motion of the several parts of the machine must depend. In like manner, the machine of the universe depends upon its creator for the commencement and the conservation of the motion of its several parts. The power by which the insensible particles of matter coalesce into sensible lumps, as well as that by which the great orbs of the universe are reluctantly, as it were, retained in their courses, admits not an explanation from mechanical causes: the effects of both of them are different from such as mere matter and motion can produce; they must ultimately be referred to God. Vegetable and animal life, and increase, cannot be accounted for, without recurring to him, as the primary cause of both. In all these respects the providence of God is something more than foresight; it is a continual influence, an universal agency; "by him all things consist—and in him we live, and move, and have our being."

Much labour has been employed to account for all the phenomena of nature by the powers of mechanism, or the necessary laws of matter and motion. But this, as we imagine, cannot be done. The "primary causes" of things must, certainly, be some powers and principles not mechanical; otherwise, we shall be reduced to the necessity of maintaining an endless progression of motions communicated from matter to matter, without any "first mover," or of saying, that the first impelling matter moved itself. The former is an absurdity too great to be embraced by any one; and there is reason to hope, that the essential inactivity of matter is at present so well understood, and so generally allowed, notwithstanding some modern opposers of this hypothesis, that there can be but few who will care to assert the latter. All our reasonings about bodies, and the whole of natural philosophy, are founded on the three laws of motion, laid down by sir Isaac Newton at the beginning of the "Principia." These laws express the plainest truths; but they would have neither evidence nor meaning, were not inactivity contained in our idea of matter. Should it be said, that matter, though naturally inert, may be made to be otherwise by divine power: this would be the same with saying, that matter may be made not to be matter. If inactivity belong to it at all, it must belong to it *as* matter, or solid extension, and therefore must be inseparable from it. Mat-
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ter is figured, moveable, discernible, inactive, and capable of communicating motion by impulse to other matter: these are not *accidental* but *primary* qualities of matter. Besides, matter void of inactivity, if we were to suppose it possible, could produce no effects. The communication of motion, its direction, the resistance it suffers, and its cessation, in a word, the whole doctrine of motion, cannot be consistently explained or clearly understood without supposing the inertia of matter. (See MATTER and RESISTANCE.) Self-moving matter must have thought and design; because, whenever matter moves, it must move in some particular direction, and with some precise degree of velocity; and as there is an infinity of these equally possible, it cannot move itself without selecting one of these preferably to and exclusively of all others, and therefore not without design. Moreover, it may be plainly proved that matter cannot be the *ultimate* cause of the phenomena of nature, or the agent, which, by any powers inherent in itself, produces the general laws of nature, without possessing the highest degree of knowledge and wisdom: which might be easily evinced or exemplified by adverting to the particular law of *Gravitation*; which see. The philosopher, says an excellent writer, who overlooks the laws of an all-governing Deity in nature, contenting himself with the appearance of the material universe only, and the mechanical laws of motion, neglects what is most excellent, and prefers what is imperfect to what is supremely perfect, finitude to infinity, what is narrow and weak, to what is unlimited and almighty, and what is perishing to what endures for ever. (Maclaurin's Account of Sir Isaac Newton's Discoveries, b. iv. c. 9. §. 1.) Sir Isaac Newton thought it most unaccountable to exclude the Deity *only* out of the universe. It appeared to him much more just and reasonable to suppose that the whole chain of causes, or the several series of them, should centre in him as their source; and the whole system appear depending on him the only independent cause. Id. §. 5.

If, then, the Deity pervades and actuates the *material* world, and his unremitting energy is the cause to which every effect in it must be traced; the *spiritual* world, which is of greater consequence, cannot be disregarded by him. Is there not *one atom of matter* on which he does not act; and is there *one living being* about which he has no concern? Does not a *stone fall* without him; and does then a *man suffer* without him? The inanimate world is of *no* consequence abstracted from its subserviency to the animate and reasonable world: the former, therefore, must be preserved and governed entirely with a view to the latter. But it is not mere energy or the constant exertion of power that is discernible in the frame or laws of the universe, in maintaining the succession of men, and in producing men, and other beings; but wisdom and skill are also conspicuous in the structure of every object in the inanimate creation. After a survey of the beauty and elegance of the works of nature, aided by the perusal of Matt. vi. 28, &c. we may ask ourselves, Has God in the *lowest* of his works been *lavish* of wisdom, beauty, and skill, and is he *sparing* of these in the concerns of *reasonable* beings? Or does he less regard order, propriety, and fitness in the determination of their states? The answer is obvious.

Providence also implies a particular interposition of God in administering the affairs of individuals and nations, and wholly distinct from that general and incessant exertion of his power, by which he sustains the universe in existence. Some speculative men, however, conceive it to be very conformable to the nature of the supreme Being, as investigated by sober reasoning, that events deriving their existence

from his immutable will as the primary cause of every thing, should succeed each other in a determinate order; or, in the language of one of the fathers, they held "the will of God to be the necessity of nature." In this providence, or predisposition of all events, they acquiesce with gratitude and confidence; believing that it fully answers the ends of a constant superintendency, accompanied by occasional interposition; that confusion and chance are removed out of the universe; that all things have been, are, and will be working together for the final good of all; and that every particular thing, even what we call a miracle itself, comes to pass in its own proper time, according to a plan established by infinite goodness and wisdom before time was. To this reasoning, though not chargeable with Atheistic fatality, or subversive of all piety, it may be objected, that it renders all supplication unprofitable, (see PRAYER,) the supreme Being inexorable, the human race impeccable, the order of nature immutable, and the future fates of individuals and nations irreversible. Nevertheless, the weight of these objections will not be great in the opinion of those, who either acknowledge no religion but that of nature, or who think that the doctrine of the final happiness of all mankind is not inconsistent with the principles of Christianity.

Many, however, are of opinion, that an original establishment, such as that to which we have now suggested, implies universal fatalism; and that in events happening amongst reasonable agents there must be infinite variations and uncertainties not possible to be regulated by it; and therefore they will think, that the other method of administering providence by interposition and constant influences will be the best adapted for bringing about a perfect regulation of events. Some persons are probably led into mistakes on the subject, by thinking of the manner in which it is most becoming the Deity to act, too strictly in conformity to that in which men are obliged to act. They have but little power, and therefore are obliged to be as frugal of it as possible. But to the Deity there is nothing difficult, and consequently nothing to influence him to choose one way of acting rather than another, besides its being more agreeable to rectitude, and more conducive to his end. The reason why the Deity has chosen to establish a course of nature is, the necessity of it as a means to produce happiness, and to give his reasonable creatures room for a proper exertion of their faculties, and for the practice of virtue. But independently of these observations, it must be very evident, that influences, consistent with the agency of free beings, and uniformly exerted to exclude every event fit to be excluded, and to produce perfect order in the administration of the world, are so far from not becoming the almighty and omnipresent parent, that we can conceive of nothing more worthy of him, or that can make his character appear more amiable. Nor is there any more reason to be prejudiced against them, than against the influence which the constitution of the world allows to every agent over events, in proportion to his power and knowledge. It is reasonable to believe, that his influence over events extends as much farther than that of any other being, and is as much more constant, as the relation in which he stands to beings is nearer, and his power and wisdom greater. Many persons, says the excellent writer of whose observations we are now availing ourselves, who think that there are no constant influences of the Deity in directing events, are ready to acknowledge, and every one who believes that Christianity was proved by miracles, must acknowledge, that there are particular emergencies in which he does interpose in the affairs of the world. Allowing that the Deity has ever once interposed since the original establish-

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ment of things, there will remain no tolerable reason for imagining, that he does not interpose continually, as far as there is any occasion.

The doctrine of providence, as it has been above explained, may be evinced from the consideration of the divine perfections. The first cause of all things must be regarded as a being absolutely perfect; and the idea of absolute perfection comprehends infinite power, wisdom, and goodness: hence we deduce the doctrine of providence. The Deity cannot be an indifferent spectator of the series of events in that world to which he has given being. His goodness will as certainly engage him to direct them agreeably to the ends of goodness, as his wisdom and power enable him to do it in the most effectual manner. This conclusion is conformable to all our ideas of those attributes. Could we call that being good who would refuse to do any good which he is able to do without the least labour or difficulty? God is present every where. He sees all that happens, and it is in his power, with perfect ease, to order all for the best. Can he then possess goodness, and at the same time not do this? A God without a providence is undoubtedly a contradiction. Nothing is plainer than that a being of perfect reason will, in every instance, take such care of the universe as perfect reason requires. That supreme intelligence and love which are present to all things, and from whence all things sprung, must govern all occurrences, and exclude from the constitution of nature all real ill and disorder. These considerations prove what has been called a *particular* in opposition to a *general* providence. We cannot conceive of any reasons that can influence the Deity to exercise *any* providence over the world, which are not likewise reasons for extending it to *all* that happens in the world. As far as it is confined to generals, or overlooks *any* individual, or *any* event, it is incomplete, and therefore unsuitable to the idea of a perfect being.

One common prejudice against this doctrine arises from the apprehension that it is below the dignity of the Deity to watch over, in the manner implied in it, the meanest beings, and all the minutest affairs. To which it may be replied, that a great number of minute affairs, if they are each of them of *some* consequence, make up a sum which is of *great* consequence; and that there is no way of taking care of this sum, without taking care of each particular. This objection, therefore, under the appearance of honouring God, plainly dishonours him. Nothing is absolutely trifling in which the happiness of any individual, even the most insignificant, is at all concerned; nor is it beneath a wise and good being, to interpose in any thing of this kind. To suppose the Deity above this, is to suppose him above acting up to the full extent of goodness and rectitude. The same eternal benevolence that first engaged him to produce beings, must also engage him to exercise a particular providence over them; and the very lowest beings, as well as the highest, seem to have a kind of right to his superintendance, from the act itself of bringing them into existence. Every apprehension that this is too great a condescension in him is founded on the poorest ideas; for, surely, whatever it was not too great condescension in him to *create*, it cannot be too great a condescension in him to *take care of*. Besides, with regard to God, all distinctions in the creation vanish. All beings are *infinitely*, that is *equally*, inferior to him.

Another prejudice by which some minds may be influenced with respect to this subject, arises from the notion, that it must be some trouble to the Deity to superintend and direct all the immense variety of events in the universe. In order to obviate this prejudice, it should be considered that the whole of possibility is alike easy to *infinite* power and

knowledge; and that it is a contradiction to imagine, by transferring human imperfections to the Deity, that they can become incumbered or perplexed.

But the chief and most common objection is that which is deduced from the supposed inconsistency of a particular providence with the liberty of reasonable agents, and the general laws of the world. Some persons, conscious of their inability to reconcile the notion of human agency with that of divine prescience or foresight, have considered men as machines, and denied that they have any agency at all. Others have conceded to the human race freedom of thought and action; but have denied that God can certainly foresee free and contingent actions. (Socini Opera, tom. i. p. 549.) The objection now stated is excellently answered in the "Religion of Nature delineated" (§ 5.), where it is shewn how by secret influences on the minds of men; by the introduction of different characters on the stage of the world at different times, and in proper places; by the ministry of invisible beings, and a suitable adjustment of physical and moral causes and events to one another, it may be possible, consistently with the laws of nature and the liberty of mankind, to direct all occurrences in such a manner, that nothing on the whole unfit to be allowed, or unsuitable to any use, shall come to pass. We may here add, that if we ourselves had a greater acquaintance with the powers of nature, and nearer access to the minds of men, we could easily overrule and direct many events not at present in our power, agreeably to our own purposes, without the least infringement of the general laws of the world, or of the liberty of mankind. But how much easier must it be for that Being to do this absolutely and perfectly, to whom all the powers of nature are subject, who sees through all dependencies and connexions, and has constant access to the heart of every man, and can turn it whithersoever he pleases? Where then can be the difficulty of believing an invisible hand, an universal and ever-attentive providence, which guides all things agreeably to perfect rectitude and wisdom: at the same time that the general laws of the world are left unviolated, and the liberty of moral agents is preserved? Some able writers on this subject have contented themselves with acknowledging that foresight appertains to God, and freedom to man, though they cannot, in any wise, comprehend the possibility of their co-existence. "I own freely to you," says Mr. Locke (Letter to Molyneux), "the weakness of my understanding, that though it be unquestionable that there is omnipotence and omniscience in God, our maker, and I cannot have a clearer perception of any thing than that I am free; yet I cannot make freedom in man consistent with omnipotence and omniscience in God, though I am as fully persuaded of both as of any truths I most firmly assent to. And therefore I have long since given off the consideration of that question, resolving all into this short conclusion; that if it be possible for God to make a free agent, then man is free, though I see not the way of it."

Here we may observe that it would be very difficult, if not impossible, to prove that it is more conformable to the nature of a wise and beneficent Being, to form a system whose parts, material and spiritual, shall all be linked together in a fatal chain, than one which shall admit the contingency of human actions, and consequently seem to require, as a means of its perfection, the interposition of divine agency.

As to the argument against the interposition of God in the government of the world, which is taken from experience, it will impress different minds differently. Those who are acquainted with and believe the history of the Jewish nation, as delivered in the bible, will find no great difficulty in admitting, that what has happened to one people may have happened

happened to another; that God may have governed the other families of the earth, if not in so visible, yet in as effectual a manner as he hath governed that of Judah. They will acknowledge the interposition of God, in what others will esteem the ordinary operation of physical or moral causes; in storms, earthquakes, famines, pestilences, foreign wars, domestic dissensions, peace, prosperity, and, indeed, in every event tending to exalt or depress a nation. But those who are not acquainted with the Jewish history, and others who disbelieve the miraculous part of it, and attribute the singularity of their condition to the operation of their religious polity, will be able to deduce no evidence of God's government of the world from the history of the Jews; and reasoning logically, they will incline to maintain, that it cannot certainly be deduced from the history of any other nation, ancient or modern. Could we, indeed, acquaint ourselves minutely, not merely with the civil or military transactions of particular ages and countries, but with the virtues and vices, the happiness and misery of all ages and all countries, from the beginning of the world; or, in other words, could we obtain a distinct and complete history of the human race, from the commencement of its existence to the present time, we should, without doubt, discern the arm of God clearly displayed in effecting the rise, regulating the progress, and accomplishing the destruction of particular states, in strict conformity to, or deviation from, the rule of moral rectitude. But the limitation of our views, and the momentary period of our existence, do not allow of our comprehending the whole of the divine economy, even in this world; and we should not therefore be surprised, that, as Dr. Clarke observes (*Evid. of Nat. and Rev. Rel.*) there should not in many ages be plain evidences enough either of the wisdom or of the justice and goodness of God, or of so much as the interposition of divine providence at all, to convince mankind clearly and generally of the world's being under his immediate care, and inspection, and government. If, indeed, the experience of the most perfect uniformity in the moral government of the world, could not, for such reasons as we have above stated, certainly enable us to decide concerning the manner of its being administered, whether by occasional interposition, or primæval ordination, we may properly enough conclude, that no argument can be justly drawn against this interposition from the want of such experience, from the real or imagined irregularity of that government. We see but a small part of this government, either as to its extent or its duration. It may be more regular than it appears to us to be; there may be, which is most probable, no irregularity at all in it; but allowing it to subsist, and to be very considerable, it will be impossible for us to determine whether that irregularity proceeds from a want of God's interposition in the government of the world, or from what some might be apt, unwisely enough, to call a defect of power, wisdom, or goodness, in its original constitution. Our faculties are annihilated in the immensity of the divine nature: the eyes of our understanding are blinded by the inaccessible brightness of the Lord's glory; it sheweth in us and around us, adorning with ineffable splendour all his works, not suffering us to doubt, for a moment, concerning either the existence or the skill of the great architect of the universe; but checking our presumption, and baffling all our efforts, when we would explore the nature of his existence, or the mode of his operation. If our reason be inadequate, as it certainly is, to the investigation of the manner in which God administers the affairs of this world, we ought thankfully to embrace the light which revelation affords us in so obscure an enquiry. A single page of that gospel conveys to us more

knowledge concerning the attributes of God and our relation to him than all the volumes of philosophy which unassisted reason ever produced. Open but the bible, and a subject before dark to the human understanding, becomes as clear as the mid-day sun. The whole history contained in the scriptures is one uniform display of the divine superintendence of our affairs. Between the sacred history and other histories there is this striking difference, that whilst the latter seldom go higher than the passions of men and the power of nature for the sources of the events they relate, the former always carries up our thoughts to the *first* cause, and directs our views to God, as the guide and governor of whatever happens. (See *Is. xlv. 7. Amos, iii. 6. Psal. cxlviii. Prov. xvi. 33. Matt. x. 29, 30. Rom. xi. 36.*) The scriptures also afford us a convincing argument for Providence, arising from the completion of the prophecies which they record. See PROPHECY.

From the variety of considerations above suggested, and on which our restricted limits will not allow of our enlarging, we may reasonably infer, that there is a wise and benevolent providence, which extends to all events: and that its interposition and influence are not discernible by us, or distinguishable, in its exertions, from the common operations of natural causes, and the course of our own thoughts, is no more any reason for denying its reality, than it is for denying the real subsistence of our own souls, or the ubiquity of the divine essence, because they are not the immediate objects of sensible observation. In some instances, indeed, the interpositions of the Deity have been open and sensible, but such interpositions are very extraordinary; and to expect them in any common cases would be madness. The delusions of enthusiasm take their rise from hence, and consist chiefly in ascribing particular feelings, without reason, to supernatural suggestion; or in imagining that the directions of God's providence, and his influence on the soul, are capable of being particularly observed. It ought also to be remarked, with respect to the doctrine of providence, that it ought never to be explained in such a manner as to destroy the value of the agency of created beings. For other reflections on the subject of this article, tending to establish the doctrine of providence, to solve difficulties and answer objections against it, and to point out the practical uses to which the acknowledgment of it is subservient, we refer to Clark's *Evidence of Natural and Revealed Religion*; Butler's *Analogy*; Price's *Dissertations*, *diff. i.*; and the Bishop of Llandaff's *Sermons*, *serm. vi.*

PROVIDENCE, in *Mythology*, a divinity among the ancients, whom they commonly represented under the figure of a woman leaning upon a pillar, holding in her left hand the cornucopia, and in the right a baton, which she points to a globe, at once to shew that all goods are derived from her, and that she extends her care over the whole universe. Sometimes she has other symbols, but this manner of representing her was the most common. The ancients, however, believed providence to be an attribute of the gods, as appears by several medals, upon which we read PROVIDENTIA DEORUM.

PROVIDENCE, in *Geography*, one of the Bahama islands, and the second in size, being about thirty miles long and eight broad. Its chief commerce arises from ships driven on its coast, or making a winter's voyage to the continent of America, which put in here in order to obtain a supply of provisions. The provisions are brought hither from Carolina, and laid up in storehouses for this purpose: but the island itself produces little else than salt and Brailette wood, which are carried over to Carolina. The inhabitants sow peas, which are gathered in six weeks, and Indian wheat,

which is productive in twelve weeks. Various kinds of fish are plentiful on the coast, and some parts of the island yield trees and plants in abundance. The principal harbour is dangerous on account of a bar, having only sixteen feet of water. The chief town is Nassau. N. lat. $25^{\circ} 2'$. W. long. $77^{\circ} 20'$.

PROVIDENCE, an uninhabited island on the coast of Honduras, eleven miles long and four broad. It has a fertile soil, salubrious air, and plenty of water, and might be easily fortified, as it was formerly by the Buccaneers. It is separated from the continent by a narrow channel. This island has neither serpents nor venomous reptiles. N. lat. $13^{\circ} 26'$. W. long. $80^{\circ} 45'$.—Also, a small island in the Indian sea. N. lat. $5^{\circ} 6'$. E. long. 78° .—Also, a small island in the Indian sea. S. lat. $9^{\circ} 10'$. E. long. $52^{\circ} 36'$.—Also, a small island in the Pacific ocean. N. lat. $4^{\circ} 2'$. E. long. $127^{\circ} 12'$.

PROVIDENCE, a county of America, in the state of Rhode island, bounded N. and E. by Massachusetts, W. by Connecticut, and S. by Kent county. It contains (1810) 10 townships, and 30,769 inhabitants.—Also, the chief town of the fore-mentioned county, and the third town in New England, in point of population. It was settled in 1636, and is situated at the head of Narraganset bay, about a mile above the mouth of the Pawtucket. It is accessible by ships of any size, which sail up and down the channel, and a bridge, over a narrow part of the bay, connects both sides of the town. The streets in this town are level and well paved. Most of the business is carried on in a street on the E. side of the bay, nearly on a level with the water and parallel to it. The houses W. of the bay are chiefly new and well-built, but most of the elegant and splendid houses are on the other side. W. of the bay are four churches, one French, two Congregational, and one Baptist, and on the other side are three, one Congregational, one Baptist, and one Episcopalian. The three last are some of the handsomest edifices of the kind, in the Union. The town library is deposited in the court-house. The population in 1810 amounted to 10,071 persons. The inhabitants are industrious and enterprising, and their commerce is extensive. Here are two spermaceti works, a number of distilleries and sugar-houses, and several large cotton manufactories. The towns in Connecticut and Massachusetts, bordering on the Rhode island frontier, trade chiefly with Providence. The town is rapidly increasing, and the new buildings are erected chiefly on the W. side of the bay. The Rhode island college is situated in this town. (See COLLEGE.) Providence is 44 miles S. by W. of Boston, and 291 N.E. of Philadelphia. N. lat. $41^{\circ} 49'$. W. long. $71^{\circ} 23'$.—Also, a township of New York, in Saratoga county, taken from Galway, and incorporated in 1796.—Also, a town of Bedford county, in Pennsylvania, containing 1492 inhabitants.—Also, a town of Essex county, in New Jersey; containing 756 inhabitants.—Also, a town of Luzerne county, in Pennsylvania; containing 589 inhabitants.—Also, a river which falls into Narraganset bay on the W. side of Rhode island, navigable as far as Providence for ships of 900 tons, 30 miles from the sea, and affording fine fish, oysters, and lobsters.

PROVIDENCE, *Lower*, a town of Montgomery county, in Pennsylvania; containing 904 inhabitants.

PROVIDENCE, *Nether*, a town of Luzerne county, in Pennsylvania; containing 594 inhabitants.

PROVIDENCE, *North*, a township of Providence county, in Rhode island, situated N. of Providence, and separated from the state of Massachusetts on the E. by Pawtucket river; containing 1758 inhabitants.

PROVIDENCE, *Upper*, a town of Montgomery county, in

Pennsylvania; containing 1395 inhabitants.—Also, a town of Luzerne county, in Pennsylvania; containing 561 inhabitants.

PROVIDENCE, *Great*, a small island in the Pacific ocean, discovered by Dampier in 1699. S. lat. $0^{\circ} 24'$. E. long. $135^{\circ} 53'$.

PROVIDENCE, *Little*, a small island in the Pacific ocean, discovered also by Dampier in 1699. S. lat. $0^{\circ} 11'$. E. long. $135^{\circ} 29'$.

PROVIDENTIÆ, in old *Law Books*, were provisions of meat and drink.

“Providentia vini ante adventum suum in cellaria erat centum deliorum.” Knighton, anno 1354.

PROVIDENTIAL CHANNEL, in *Geography*, a channel between some shoals in the South Pacific ocean, through which the Endeavour passed, near the N.E. coast of New Holland; 40 miles E. of Cape Weymouth.

PROVIDENTIAL *Bank*, a small circular strait near the S.W. coast of New Guinea. S. lat. $5^{\circ} 38'$. E. long. $137^{\circ} 50'$.

PROVINCE, PROVINCIA, among the Romans, was a country conquered by them, without the bounds of Italy; governed by a deputy, or lieutenant, and having peculiar laws and privileges. See LEGATORY.

Nicod derives the word à *procul vivendo*, living afar off; but it is better deduced from *pro* and *vinco*, I overcome. Of these countries that part of France next the Alps was one; and it still retains the name *Provençe*.

PROVINCE is now chiefly used for a canton, or division of a kingdom or commonwealth, comprehending several cities, towns, &c. all under the same government; and usually distinguished by the extent either of the civil or ecclesiastical jurisdiction.

The provinces were anciently duchies, counties, &c. which have been since all reunited under the same chief.

The church distinguishes its provinces by archbishoprics, each containing a certain number of bishoprics.

In this sense England is divided into two provinces, Canterbury and York.

The monks make particular divisions of provinces, according to the antiquity and number of convents in each.

The United Provinces are the seven northern provinces of the Low Countries; which, revolting from the Spanish dominion, made a firm and perpetual alliance, offensive and defensive, at Utrecht, in the year 1579. They have lately undergone several revolutions, and their permanent condition is not yet decided.

PROVINCE, in *Geography*, an island in Delaware river, six miles below Philadelphia; joined to the main land by a dam.

PROVINCE *Town*, a town of America, situated on the hook of Cape Cod, in Barnstable county, Massachusetts, three miles N.W. of Race Point. Its harbour, which is one of the best in the State, opens to the southward, and has depth of water for any ships. This was the first port entered by the English, when they went to settle in New England, in 1620. It has undergone various changes of prosperity and decline. It is now said to be rising, and contains 936 inhabitants, who depend upon the cod fishery, for which they employ about 30 sail, great and small, and in which they are very expert and successful. Their houses are one story high, and set upon piles, that the driving sands may pass under them. Their lands yield nothing, so that they are dependent upon Boston and the neighbouring towns for every vegetable production. Their cows, of which they have about 50, are fed in winter on sedge, cut from the flats, in the spring upon beach grass, growing at intervals

on the shore, and in summer on what they find in the sunken ponds and marshy places that lie between the sand-hills, where they are seen wading, and even swimming, plunging their heads into the water up to their horns, and picking a scanty subsistence from the roots and herbs produced in the waters; 120 miles by land from Bolton. N. lat. 42° 3'. W. long. 70° 9'.

PROVINCIAL, PROVINCIALIS, something relating to a province.

Thus we say, provincial council, or synod, &c. See SYNOD and COUNCIL.

PROVINCIAL Constitutions. See CONSTITUTION.

PROVINCIAL Establishments in America. See the account of CHARTER Governments.

PROVINCIAL, in the monastic sense, denotes a person who has the direction and superintendency of several convents of a province, according to the division established in that order.

The general of the order has several provinces under him; the provincial several priors, abbots, &c.

PROVINE, PROVIN, a branch of a vine laid in the ground to take root.

PROVING of Guns, is an operation performed in order to determine whether they will bear the quantity of powder allotted for this purpose, or whether they are sufficiently strong for service. The rule of the board of ordnance is, that all guns under twenty-four pounders be loaded with a charge of powder, which weighs as much as the shot; *i. e.* a brass twenty-four pounder with 21 lb.; a brass thirty-two pounder with 26 lb. 21 oz.; and a forty-two pounder, with 31 lb. 8 oz.; the iron twenty-four pounder with 18 lb., the thirty-two with 21 lb. 8 oz., and the forty-two pounder with 25 lb. The brass light field-pieces are proved with a quantity of powder that weighs half as much as their shot; except the twenty-four pounder, which is loaded only with ten pounds. See GUN.

In the proof of all forts of small arms, the quantity of powder used is the weight of the ball exactly. For the number of bullets used in proving muskets, carabines, and pistols, see BULLET.

When guns of a new metal, or of a lighter construction, are proved, then, besides the common proof, they are fired two or three hundred times, as quick as possible, loaded with the common charge allowed for actual service. In proving cannon, with a view of ascertaining their being well cast, without any cavities in the metal, and their being fit to resist the effort of their charge of powder, the piece is laid upon the ground, supported only by a log of wood in the middle, of about five or six inches thick, to raise the muzzle a little; and then the piece is fired against a solid butt of earth. The instruments used in the proof of cannon are the searcher and reliever. Lieutenant-general Defaguliers has lately invented a curious instrument for finding the principal defects in pieces of artillery, which is no sooner introduced into the hollow cylinder of the gun than it discovers its defects, and particularly its not being truly bored, to which most of the injuries incident to pieces of artillery are owing. In the proof of mortars and howitzers, they are placed upon the ground, with some part of their trunnions or breech sunk below the surface, and resting on wooden billets at an elevation of about seventy degrees. The mirror is generally the only instrument for discovering the defects in these pieces. In order to use it, the sun must shine; the breech must be placed towards the sun, and the glass over-against the mouth of the piece, and thus the flaws in the bore and chamber are observed. The Prussians prove their battering train and garrison artillery with a

quantity of powder equal to half the weight of the shot, and by firing seventy-five rounds as quick as in real service, *i. e.* two or three rounds in a minute. Their light field-train, from a twelve-pounder or upwards, are proved with a quantity of powder equal to one-third of the weight of the shot, and fired a hundred and fifty rounds, at three or four rounds in a minute. From a twelve-pounder downwards, they are proved with a quantity of powder equal to one-fifth of the shot's weight, and fired three hundred rounds, at five or six rounds each minute, properly sponged and loaded. Their mortars are proved with the chambers full of powder, and the shells loaded. Three rounds are fired as quick as possible. The Dutch prove all their artillery by firing each piece five times; the first two rounds with a quantity of powder equal to two-thirds of the weight of the shot, and the three last rounds with a quantity of powder equal to one-half the weight of the shot. The French method of proof is the same with that of the Dutch. The Portuguese prove their artillery in the following manner.

42 } pounders, { 1st shot 30lb. } then diminishing 2lb. each
32 } 6 rounds { ——— 26lb. } round.
24 } ——— { ——— 18lb. }

12 } pounders, { 1st shot 10lb. } diminishing 1lb. each round.
6 } 6 rounds { ——— 5lb. } ——— ½lb. each round.
8 } ——— { ——— 2½lb. } ——— ¼lb. each round.

They are fired only once every minute. Their mortars are proved by filling the chambers full of powder, a loaded shell, and the mortar rammed full of earth.

PROVING of Gunpowder. See GUNPOWDER, and POWDER-Triers.

PROVING of Wills, in Law. See PROBATE, EXECUTOR, and WILL.

PROVINS, in Geography, a town of France, and principal place of a district, in the department of the Seine and Marne; 11 posts S.E. of Paris. The town contains 5503, and the canton 9747 inhabitants, on a territory of 130 kilometres, in 14 communes. N. lat. 48° 34'. E. long. 30° 21'.

PROVISION, PROVISIO, any thing got or procured, as necessary for the subsistence of life.

Salting of unwholesome provisions is prohibited by 51 Henry III. stat. 6. cap. 7. under pain of amercement for the first offence, pillory for the second, fine and imprisonment for the third, and abjuration of the town for the fourth. And by 12 Car. II. c. 25. § 11. any brewing or adulteration of wine is punished with the forfeiture of 100*l.*, if done by the wholesale merchant; and 40*l.* if done by the vintner or retail trader.

PROVISIONS, *Preservation of*, is an art essential to the existence of a very numerous class of men who reside in situations where they must be furnished with provisions transported from a distance, or so preserved that they can be carried with them, as is the case at sea, and in remote colonies. To others it is of great importance in reserving the produce of fruitful seasons for future supplies.

The modes of preservation which are in use are as follow:

1. By salting either with dry salt, or in salt pickle.
2. By sugar, which is, however, confined to fruits and vegetable matters.
3. By drying up the juices and parts liable to the putrefactive fermentation, as is practised with a variety of herbs, as thyme, mint, balm, &c. and hay.

Drying is sometimes performed on fish and animal substances. The native Americans had a practice of preserving

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flesh for many months, by cutting it into slips, and drying it slowly and completely: the Buccaneers of the West Indies imitated this custom, and derived their appellation from this circumstance. Their method is described in our article BUC-CANEERS. The food, thus prepared, may have been considered good by the American savages; but with us a slight salting is usually given to the meat before it is attempted to be dried, and hence our present method of drying does not differ from dry salting, except that the salting is more slight, and the drying more complete than used for hams or bacon, and the flesh must be cut into thin pieces, to render the drying effective.

4. By pickling in vinegar, as for vegetable pickles, and fish, as salmon, mackarel, sprats, &c. Another mode of pickling is in alcohol or spirits; though this is not practised for provisions (except some choice kinds of fruits), on account of the great expence of spirits: the custom of anatomists preserving their preparations in spirits, shews that it will succeed with animal matters.

5. By so packing up the provisions in bottles, or other cases, as to effectually exclude the air, and thus prevent fermentation: there are of this class potted meats, which are covered up in melted suet, fat, or butter.

6. Another mode, discovered in France by M. Apert, has been brought to a high degree of perfection in this country, by Messrs. Donkin, Hall, and Gamble, whose process we shall describe further on.

7. By freezing meat or fish, and packing it in snow or ice, it may be preserved as long as the freezing is continued. This is very extensively practised in some cold countries; and has of late years been successfully employed in the bringing of fresh salmon from the northern Scotch fisheries.

Of all the methods of preserving meat, *salting* is the most universal, mariners being almost exclusively supported upon salted provisions; and to the inhabitants of towns and districts, where provisions are scarce, it offers a valuable supply, by importation, from places where they have abundance: such is the case of Ireland, where a very principal trade is in salted pork and beef, for the supply of the English navy, and its coasting towns. Newfoundland is alike famous for its salted cod-fish, and the Dutch for their herrings.

Meat which is to be dry salted, such as bacon, hams, hung-beef, &c. is first rubbed very effectually with a mixture of salt, bay salt, and saltpetre over every part; for should any of the surface escape, that part would not be preserved; and to avoid this defect, the rubbing must be repeated several times. The meat being kept in leaden pans or casks, will by its juices form a brine with the salt; which is from time to time taken up and poured over the meat repeatedly as it runs down. This is continued for a fortnight or three weeks, according to the size of the pieces of meat, till the salt has pervaded the whole substance. The meat is now removed from the brine, and the salt being rubbed off with dry coarse cloths, it is hung up to dry in a warm place, or in a chimney, if a smoky flavour is desired, as in hams, hung-meat, and red herrings. When properly dried, it will keep for a long time. For further particulars, see HAM, HERRINGS, &c.

Salting in pickle is conducted very nearly in the same manner, except, that after the meat has imbibed the salt, it is packed in casks, and filled up with very strong brine, or salt pickle: indeed, if it is to be kept a long time, as for a sea voyage, it is packed solid with salt. In salting, a mixture of sugar is sometimes used, but this is more for producing a good flavour, than for the preservation.

In salting beef and pork on a large scale for the navy, it is begun immediately after the beast is killed, and before the

meat is cold. The salt used is an equal mixture of bay-salt and saltpetre, pounded together, and prepared by heating in an oven; with this the warm meat is sprinkled over at the rate of about two ounces to the pound, if intended for long keeping; it is then laid by upon shelving boards for twenty-four hours, and a strong pickle drains from it: the salting is now repeated, the pieces are turned over, and then they lie for another twenty-four hours, by which time the salt will be all melted, and have penetrated the meat; it is now drained off, and each piece wiped with a dry coarse cloth. Previous to packing it in the cask, it must be well rubbed with common salt, mixed with sugar, (the salt being made hot in an oven before it is mixed,) and then applied, whilst hot, in the proportion of one-half the weight of the meat, and this will be a sufficient quantity to pack the casks up solid, the interstices between the pieces of meat being filled up, which must be very carefully done, and the coopering effectual, to render the cask tight. The size of the casks should be such, that their contents will be consumed very quickly after opening the cask, as the less the meat is exposed to the air the better. A great deal depends upon the meat being salted whilst it is warm, and with hot or dried salt; probably because its affinity for moisture is increased, and it thus strikes more readily into the meat, to mix with the juices thereof. Pork is treated in the same manner, but a smaller proportion of sugar is used. Meat thus preserved will keep good for the longest voyages, in any climate.

Salted meats are by far less nutritious than fresh, particularly when so highly salted, as is requisite for long keeping at sea. This is the principal cause of the scurvy, which so commonly afflicts seamen. Duhamel, in his "Santé des Marins," says: "The salt meat with which the crews of vessels are fed, is known to be one of the principal causes of the scurvy; it seems that the same causes which operate to prevent the fermentation of meat, also render it difficult of digestion; though a small quantity of salt may be an obstacle in the way of putrefaction, the too abundant and frequent use which is made of it, must cause great obstructions in the smaller vessels of the body; and these obstructions cannot fail to overload the stomach of men who have to digest dry vegetables and biscuits, which sailors advanced in years are not always able to chew completely. Bad digestion and obstruction in the lower vessels, may occasionally give rise to those ulcers in the mouth, and spots which denote the scurvy."

Salt communicates an unpleasent rough flavour to substances preserved by it, hardens the animal fibre, and renders it difficult of digestion: the longer the meat is kept, the more forcibly these objections apply. Another great defect is, that it is necessary to remove it, by washing away great part of the salt employed; and therefore all parts of the meat which are soluble in water, are carried away with the salt. The usual mode of washing practised by the seamen, is to suspend the pieces of meat from the end of the ship's bowsprit, and thus by the waves and the pitching of the ship, it is constantly dipped in the water, and drawn out again till the superfluous salt is washed away, and it becomes fit for cooking. From some experiments which have been communicated to us on the salted beef used in the navy, it appeared that a keg of 56lbs. weight, when it had been a month in pickle, was opened, the bones were separated, and found to weigh 5lbs. 6 oz.; the meat was boiled by steam, and lost 15lbs. 10 oz. in that operation; the produce of meat fit for eating was, therefore, 35lbs., the total loss being 21lbs., or about 40 per cent.

Another barrel, containing 100lbs. of prime mess beef, was opened eight months after it was pickled, and was found

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found to weigh 103lbs., having gained 3lbs. from being saturated with the pickle; the bones being cut out, weighed 9lbs. 10oz.; and in boiling it diminished 42lbs. 14oz.; leaving only 47lbs. 8oz.; i.e. that more than half was lost. In a third experiment, a barrel containing 26 pieces of beef, of 8lbs. each, when opened, had gained 5lbs., as it weighed 213lbs.; the bones in this weighed 13lbs. 8oz., and the waste in boiling was 90lbs. 14oz., leaving 103lbs. 10oz. of good meat, after a loss of rather more than half.

The preservation of provisions by sugar is rarely practised in the large way, being chiefly confined to preserving fruits for winter consumption, or for the decoction of plants, when reduced to syrups and essences. The general method is to put the fruit, with a sufficient quantity of sugar, into a vessel, which is placed on the fire, till the sugar, mixing with the juices which exude from the fruit, forms a strong syrup. The same effect will be produced by baking the fruit in a jar containing the sugar: after the heat has caused the syrup to sufficiently penetrate the fruit, it is suffered to cool, and then put close into pots or jars, which are filled up with the syrup, and covered close by paper, and a cover of a skin of bladder or leather is tied over the mouth. The paper which immediately covers the fruit is dipped in brandy, or other spirits, to preserve the surface from becoming mouldy, as it otherwise might do, and taint the whole.

Sugar, from the strength of its own flavour, conceals and destroys all other flavours in a greater or less degree, even that which we wish to preserve the enjoyment of, such as the pleasant acidity of certain fruits. A second inconvenience is this, that a large quantity of sugar is required, in order to preserve a small quantity of some other vegetable matters, and hence the use of it is not only very costly, but even in many cases very pernicious. Thus, the juice of certain plants used in medicine cannot be reduced to a syrup or essence which will keep a long time, but by means of nearly twice the quantity of sugar: it results from this, that those syrups or essences contain much more of the properties of sugar than any other medicinal substance, and frequently the sugar, by counteracting the operation of the medicine, is hurtful to the patient.

Vinegar is used for preserving salmon, and some other kinds of fish; such are generally slightly salted first, and then boiled in the casks, that they may be fit for the table when the casks are opened; they are packed for keeping in barrels, which are filled up with good vinegar, and it is this which preserves them.

Many vegetables, such as cabbages, cucumbers, onions, &c. are preserved by pickling; the former of these is prepared in a very large way for the navy, it being found advantageous for the men, in long voyages, to use both vinegar, and vegetable food, to prevent scurvy: they call it *four kroust*. The largest and finest cabbages are used; they are cut up and salted some time in strong brine, then packed in the casks, and filled up with vinegar which has been boiled with some spice, and is poured hot upon the cabbage. It requires no cooking when opened.

Potted meats are generally cooked and minced very fine before they are put up: this is done in jars, which being well filled, are then covered up by butter poured over the meat while in a melted state; this preserves the meat, by preventing the access of air. Mutton suet melted, and poured upon the meat, is still better, if it is to be kept long, or in a warm climate, as the butter then becomes too fluid. Whole joints, enveloped in this substance, may be kept in the West Indies, but not for a sufficient length of time to

render it an effective method: the suet should be made from the fat of a sheep's kidney.

By Messrs. Donkin and Co's method, the meat or vegetable to be preserved is first partially cooked, by boiling, baking, roasting, or otherwise, and then enclosed in canisters, or cases of metal, or in bottles of glass or glazed stone ware, which are very carefully closed, with every attention, to render them perfectly air-tight. In this state the cases or bottles are subjected to a second boiling, which is sufficient to complete the cooking. This boiling completely deprives that small quantity of air which is contained in the vessel of its oxygen, and consequently of its fermentation, and if the vessel is sound, the contents will remain unchanged for the longest periods of time which can ever be required. Nor do they become any worse for longer keeping, as salt provisions do by undergoing a progressive decomposition and change for the worse, and imbibing a greater quantity of salt, till at length they are not eatable. After the boiling of the vessels, a considerable diminution in the bulk of the contained air is found to take place, which is shewn by the sides of the vessel (when made of a yielding substance, such as tinned plate) becoming concave on the outside, from the pressure of the atmosphere: from this circumstance, the atmospheric air has always a tendency to enter the vessel, and therefore the most minute leak will spoil the provisions. To render the vessels tight is the great difficulty in the process, and in this the English patentees have perfectly succeeded.

M. Apert, in France, was rewarded by the French government in 1810, and published an account of his process, which has since been translated into English. In this he observes, that his method consists in inclosing the substances to be preserved in bottles, and corking them with the utmost care, for it is chiefly on the corking that the success of the process depends.

These inclosed substances are boiled in a water-bath for a greater or less length of time, according to their nature, and are then withdrawn from the bath. M. Apert describes his laboratory to consist of four apartments, the first a kitchen, furnished with stoves, and all the utensils necessary for cooking the animal substances which are to be preserved; the second is a dairy, and appropriated to the preparation of milk, cream, and whey; the third apartment is used for corking the bottles, and tying the corks down with wires, also inclosing the bottles in bags, to preserve their contents in the event of their breaking during the boiling; the fourth apartment is for the boiling; it contains three large but shallow copper boilers, placed upon stoves, raised on brick-work. These boilers are each furnished with a stout lid, fitted to rest upon the vessels within; and each boiler is furnished with a large cock below, to let out the water at a proper time. These large boilers are destined to receive the bottles or vessels containing the objects intended to be preserved, in order to apply the action of heat to them in a suitable manner, and thus they constitute so many water-baths. The reason why it is necessary that the boilers should be furnished with cocks is, that it would take up too much time to leave so large a body of water over a heated stove till it became cool; and that, on the other hand, it would do great injury to the substances to let them remain too long exposed to the heat.

The principle by which all substances of food are preserved and kept fresh is invariable in its effects; but the result in particular cases will depend upon the fitness of each individual application of the principle to the substance which is to be preserved, attention being paid to its peculiar qualities. In every case the exclusion of air is a precaution

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of the utmost importance to the success of the operation; and a perfect knowledge of bottles, or other vessels to be used, of corks and corking, is requisite. Glass is to be preferred, as being the matter most impenetrable by air; and M. Apert has not ventured to make any experiment with a vessel made of any other substance. The necks of ordinary bottles are generally too small; they are also ill made, and too weak to resist either the blows from the bat which drives the corks, or the action of the fire. He therefore caused bottles to be made with a rim or ring projecting within the interior surface of the neck, placed below, and resembling the form of the rim which is at the top of the exterior surface of the necks of ordinary bottles. The object of this was, that when the cork had been driven into the neck of the bottle three-fourths of its length, it should be compressed in the middle. In this manner the bottle becomes perfectly corked on the outside as well as within: the cork then opposes an obstacle to the swelling or expansion, which arises from the operation of heat upon the substances inclosed within the bottle. This mode of forming the neck of the bottle is the more indispensable, as the swelling will sometimes be so strong as to push out corks of three or four lines in length, though confined by two iron wires crossed. The bottles and vessels should be made of a tough substance; and the glass ought to be of equal thickness in every part, or it is liable to break in the water-bath. Too much attention cannot be given to the good quality of the corks, which should be of eighteen or twenty lines in length, and of the finest quality: they should be compressed by biting the cork three-fourths of its length, by means of an instrument already described in our article CORK, beginning at the small end. The cork is by this operation made more supple, its pores are brought closer, it is somewhat lengthened, and its thickness is so much diminished at the extremity which is put into the mouth of the bottle, that a large cork may be made to enter a very moderate opening. The action of the heat within the vessel causes the cork to swell within, and the corking is thus rendered perfect. Before corking, care should be taken that those bottles containing liquor are filled only within three inches of the outer rim, lest they should burst, from the expansion occasioned by the application of heat to their contents. When the bottles contain vegetables, fruits, &c. they may be filled up to within two inches of the rim. The bottles are corked by driving the corks down with a bat or mallet, and being thus well stopped, the corks are fastened down with a couple of iron wires crossed over the cork, and twisted round the neck of the bottle: each bottle is then inclosed in a bag of canvas, or coarse linen cloth, made for the purpose, sufficiently large to inclose the whole of the bottle up to its neck. These bags are made in the shape of a muff, open at both ends; one of these ends is drawn with a string, leaving an opening of about the width of a crown-piece; the other end is provided with a couple of small strings to tie the bag close round the neck of the bottle.

For preserving solid and bulky substances, such as poultry, game, meat, fish, &c. M. Apert employs glass jars, which have necks of two, three, or four inches diameter, and are of a larger or smaller size, according to the article they are to contain; they are furnished, like the bottles, with a projecting rim, not only to strengthen the neck, but also for receiving the iron wires which are to bind the corks: but he observes, that to cork up these vessels completely, is rendered more difficult, and demands especial care, from the large size of the mouth or neck, and the thinness of the cork, also from the ascending

pores of the cork being against the grain of the bark; he therefore formed stoppers of three or four pieces of cork, from twenty to twenty-four lines in length, cemented together the proper way of the grain, the pores of the cork being placed horizontally: he joined the pieces by means of isinglass.

Having driven the stopper into the jar by means of the bat, he makes use of a compound luting, which is lime slaked in the air, by being sprinkled with water till it becomes reduced to a powder. This lime, mixed with cheese made of skimmed milk (*fromage à la pie*), and formed to the thickness of paste, produces a luting, which hardens rapidly, and which withstands the heat of boiling water; he covers the whole of the outside of the stopper with this luting, and covers the edge of the jar with hemp and strips of linen, placed above, close to the stopper, and hanging down to the rim. The bottles, or jars, being thus prepared, are placed upright in the boiler, or water-bath, which is filled with cold water up to the necks of the vessels; then closing the boiler with its lid, which is made to rest upon the vessels, the upper part of the lid is covered with a piece of wet linen, in order that the sides of the lid may exactly fit, and all evaporation from the water-bath be impeded as much as possible.

The fire being lighted, when the water-bath begins to boil, care must be taken to maintain the same degree of heat during the greater or less length of time required by the substances exposed to its influence, and then the fire put out as quickly as possible.

A quarter of an hour after the fire has been extinguished, the water is let out of the bath by means of the cock, and half an hour afterwards the boiler is opened; but the bottles are not moved till one or two hours after the uncovering, and this terminates the operations.

The utmost attention to cleanliness in all the utensils employed for the preparation of the substances to be preserved, is absolutely indispensable.

The author gives detailed instructions for the preparation of all kinds of provisions; as meat, game, soup, gravy, jelly, eggs, milk, whey, vegetables of all kinds, &c.; but as the directions do not give any farther insight as to the principle, we shall conclude this account with the periods which he advises for boiling in the water-bath. Thus, for preserving boiled meat, the bones are taken out, and the meat half cooked; then inclosed in the jars, which are filled up with the broth or gravy of the meat, corked, luted, and tied up in the bags; the jars are after this boiled in the water-bath for one hour. Meat prepared in this way was found perfectly fresh at the end of a year and a half.

Nutritious gravy, for the use of sick soldiers and sailors, was put up in bottles, and boiled in the bath two hours.

Jelly, which has a previous cooking for a considerable time, requires only a quarter of an hour boiling in the bottles to preserve it.

Round of beef, mutton, fowls, and young partridges, are dressed as if for common use, but only three-fourths done, then packed up and boiled half an hour; the same for eels, carp, pike, &c. These have been sent to sea for four months, and returned perfectly fresh, without the least change.

These results prove sufficiently that the preserving principle, applied with the same preparatory process, and with equal care and precaution, will in general preserve all animal productions. But it is to be observed, that in the previous cooking of each article, it is to be only three-fourths dressed at most, in order that the remainder of
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the requisite cooking may be communicated by the heat of the water-bath.

There is a number of articles which can bear an additional hour of boiling in the water-bath, without any danger, such as broth, gravy, jellies, and the essences of meat, poultry, and ham, the juice of the grape, and of plants, &c. But there are also others which will sustain a great injury from a quarter of an hour, or even a minute too much boiling: thus the result will always depend upon the dexterity, intelligence, and judgment of the operator.

Meat which has, in the preparatory dressing, as well as the boiling it received in the water-bath, obtained its due quantity of cooking, will, when it is taken out to be used, require only to be properly warmed, in order to produce both soup and meat; likewise poultry, game, and fish, which have received three-fourths of their dressing in the preparatory process, and the remainder in the water-bath, as already pointed out, may, when taken out of the vessels, be heated to the proper degree, in order to be instantly served at table. If, for instance, the substance taken from the bottle, or jar, had not received either enough previous dressing, or enough heat from the water-bath, it is immediately put on the fire to supply what is deficient. Consequently, when the operator has taken due care in making his preparations, having properly seasoned and dressed the provisions, the use to be made of them afterwards will, at all events, be easy and convenient, for they will need only to be warmed; or they may, if necessary, be eaten cold.

Substances thus prepared and preserved do not, as might be imagined, require to be consumed as soon as they are opened. Provisions may be used from a vessel eight or ten days after they have been uncorked, care being taken only to replace the cork as soon as the necessary part of the provision has been taken out. Besides, it is easy to regulate the size of the vessels according to the rapidity of the expected consumption.

New laid eggs are to be put up in a jar, and packed with raspings of bread, to prevent their breaking; the jars are then boiled in the water-bath, heated to 200° : they were preserved six months by this process. Milk is to be boiled in an open pan, placed in the water-bath, till it is reduced to one-half its quantity, frequently skimming it, and half an hour before it is taken out of the bath it is to have the yolks of eight new eggs added to a quantity of about 15 pints of the concentrated milk; which being put into bottles, they are to be boiled in the water-bath for two hours. Cream, condensed by boiling to four-fifths of its quantity, and then boiled in the bottles for one hour, was so effectually preserved for two years, that it was made into butter at the end of that period.

For vegetables it is observed that the difference of climate renders the productions of different countries more or less early, and varies their qualities, kinds, and denominations; attention must, therefore, be given by the operator to the circumstances of the spot in which he resides.

At Paris and its environs, June and July are the best months for preserving green peas, small Windsor beans, and asparagus. At a later period, these vegetables suffer greatly from heat and dryness. In August and September, artichokes, French beans, and cauliflowers may be preserved.

In general, all vegetables intended to be preserved should be used as recently gathered as possible, and prepared with the utmost rapidity, so that there should be, as it were, but one step from the garden-bed to the water-bath.

Green peas are recommended to be taken when in a middling state of growth, and the larger being separated from the rest, they are bottled without previous boiling, and

boiled in the water-bath an hour and a half, if the weather is cool and moist, or two hours in dry hot weather: the large peas are boiled by themselves for two hours, or two hours and a half, under similar circumstances.

Asparagus, instead of previous boiling, is merely dipped into boiling water, then put heads downwards into the bottles, which are only suffered to remain in the water-bath until the water boils.

Windsor beans are bottled, and, without previous boiling, are boiled one hour in the water-bath; or if the skins of the beans have been first taken off, they are boiled one hour and a half.

Cauliflowers have their useless leaves taken off, and are plunged into boiling water, and then immediately into cold water, and being well drained, are closed up in jars, which are boiled for half an hour in the water-bath.

As the seasons vary, and are sometimes dry, and sometimes moist, it is obvious that it is necessary to study, and adapt the various degrees of heat required according to the season. Attention to this circumstance must never be disregarded. For instance, in a cool and damp year, vegetables are more tender, and consequently more sensible to the action of fire. In this case the water-bath should be made to boil seven or eight minutes less; and in dry seasons, when vegetables are firmer and better able to support the action of fire, seven or eight minutes more boiling should be added to the time specified.

The first notice of this important discovery in England was by a patent taken out in 1810, by Mr. Durand, who received the communication from France; the patent-right has since been transferred to Messrs. Donkin, Hall, and Gamble, who have established a considerable manufactory in Blue Anchor road, Bermondsey, which they permitted us to inspect. Their kitchen for cooking, and larder for cooling the meat before it is packed up, are very complete, and they have considerably improved upon the French mode above-described, by substituting, in most cases, canisters of tinned iron for the glass jars and bottles; they are made by very carefully soldering up the tin plates to form circular or oval boxes, of dimensions suited to what they are intended to contain; and these, when filled with the prepared meat, have lids soldered down upon them very closely: they are then boiled in the water-bath, but do not require that precaution of gradually heating and gradually cooling, which must be observed with glass vessels, which would otherwise be subject to break. The canisters may be put into the bath when the water is boiling, and taken out when finished, another set being put in, so as to keep constantly going. Immediately the canisters are withdrawn, they are carefully examined, to discover and stop the leaks, and the boxes are then well varnished, to prevent rust. Another great advantage arises from the use of tin canisters, *viz.* that they will, in the course of a fortnight's trial, afford a criterion to judge of the process being effectually performed; for as the vessel cools after the operation of the water-bath, the lid and bottom of the canisters become concave; and their remaining so, infallibly indicates that their contents will keep fresh; but if fermentation takes place, gases will continue to be generated until the top and bottom become convex, which circumstance denotes the contents to be spoiled. After every precaution has been taken to render the closure of the canisters perfect, they are ticketed, to explain their contents, weight, and the date of preparation, and are hung up in a room, heated to that temperature which is found most conducive to fermentation, if any can be generated: here they remain from three weeks to a month, and if their sides continue concave, they are

are then considered as being fit to send out. This criterion of perfect preservation is obtained by the English patentees, which was not the case with M. Apert, who describes no method of trial, except an examination of the glass bottles after the boiling, to find if they had any stars or flaws, or faults in the corks, which could admit the air. Indeed the tin canisters are more likely to be tight than the glass vessels, from the circumstance that they admit of being more nearly filled up with the meat or gravy; because the expansion which takes place in the boiling, is in some degree permitted by the sides, top, and bottom of the canisters becoming convex. In the subsequent cooling also, the yielding of the sides to a concave form relieves the pressure of the atmosphere; whereas, in a bottle which cannot yield, there is always a partial vacuum or rarefaction within the vessel, and the atmospheric air presses to enter at the most minute leak in the cork, with much more force than on the tin vessel, in which the elasticity of the tin plates to assume their plane surfaces, is the only force to cause the air to enter into the vessel.

For milk, soups, peas, and other similar articles, the patentees employ bottles, but have found reason to prefer a strong kind of earthen-ware, well glazed, to glass, as being less expensive and hazardous, either in the preparation or in carriage.

We have been thus particular in the details of this process, as we consider it an object of great importance to the health and comfort of seamen, a class of men to whom this country is so greatly indebted for its present affluence, that no pains should be spared to render their condition as comfortable as possible. The obvious advantages of the discovery are, that provisions so preserved will entirely supersede the necessity of taking out live stock to sea, which, exclusive of its own incumbrance in a ship, must be accompanied with that of its provender and fresh water. Much room, trouble, and expence will be saved, besides the loss sustained by bad weather, disease, and the wasting of the animals, which always takes place in a voyage. Being ready dressed, such meat may be eaten cold, or, if preferred, heated in a few minutes, by which fuel will be saved, and the difficulty of cooking at sea in bad weather rendered of little importance. They are well calculated for all expeditions of boats' crews, landing-parties, &c.

The salutary effects which the army and navy would derive from even an occasional supply of fresh provisions, cannot be too highly appreciated, as it would most essentially contribute to the restoration of the health and services of the sick and wounded, and eventually save to the state the valuable lives of many of our sailors and soldiers.

PROVISION, in *Traffic*, is sometimes used for the wages due to a factor. See FACTORAGE.

PROVISIONS, *Commissary of*. See COMMISSARY.

PROVISIONS, *Park of*. See PARK.

PROVISION, in the *Canon Law*, the title or instrument, by virtue of which an incumbent holds, or is provided of, a benefice, bishopric, or the like.

Ordinary collators give provision in case of vacancy by death, pure and simple demission, and permutation. See COLLATION.

The court of Rome grants provisions by resignation, devolution, and prevention.

PROVISIONS by *Prevention*, are also called *gratie expectativa*, and *mandata de providendo*; of the great abuse of which throughout England, frequent complaint was made in our ancient statutes, and a remedy was provided for the same by the statutes of premunire. See EXPECTATIVE *Graces*.

Provisions of small benefices, in the court of Rome, are

only simple signatures, which are, as it were, minutes of the bull; because the bulls themselves, dispatched on parchment, would be too expensive. The signature is no more than the petition of the impetrant answered by the pope in these words: "Concessum uti petitur in presentia D. N. papæ," wrote in the hand of the prelate who presides over the signatures.

Extraordinary provisions are signed by the pope himself in these words, "Fiat ut petitur," with the first letter of his name.

PROVISO, in *Law*, a condition inserted in a deed, upon the observance of which the validity of the deed depends.

PROVISO, in *Judicial Matters*, is where the plaintiff desists from prosecuting an action, by bringing it to trial in a due time; in which case the defendant may take out a venire facias to the sheriff, having it in these words: *Proviso quod*, &c. to the end that, if the plaintiff take out any writ to that purpose, the sheriff shall summon but one jury upon them both. In which case it is called *going to trial by proviso*. See JURY.

But this practice hath begun to be disused, since the statute 14 Geo. II. c. 17, which enacts, that if, after issue joined, the cause is not carried down to be tried according to the course of the court, the plaintiff shall be esteemed to be non-suited, and judgment shall be given for the defendant as in case of a non-suit. In case the plaintiff intends to try the cause, he is bound to give the defendant (if he lives within forty miles of London) eight days notice of trial; and if he lives at a greater distance, then fourteen days notice, in order to prevent surprise: and if the plaintiff then changes his mind, and does not countermand the notice six days before the trial, he shall be liable to pay the costs to the defendant for not proceeding to trial, by the same last-mentioned statute. The defendant, however, or plaintiff, may, upon good cause shewn to the court above, as upon absence or sickness of a material witness, obtain leave upon motion to defer the trial of the cause till the next assizes.

PROVISO, *Casu*. See CASU.

PROVISO is also a sea term. A ship is said to moor a proviso, when she has an anchor out, and also a hawser ashore; and so is moored with her head to the shore with two cables at least.

PROVISOR is generally taken for him who hath the care of providing things necessary; in which sense it coincides with purveyor.

PROVISOR *Monasterii* is used for the steward or treasurer of a religious house.

PROVISOR, in our *Statutes*, also denotes a person who sued to the court of Rome for a provision, or expectative grace. See PREMUNIRE.

"Provisores dicuntur, qui vel episcopatum, vel ecclesiasticam aliam dignitatem in Romana curia sibi ambiebant de futuro, quod ex gratia expectativa nuncuparunt, quia, usque dum vacaret, expectandum esset." Spelm.

PROVISORS, *Statutes against*. See PREMUNIRE.

PROULACH, in *Geography*, a town of the duchy of Carinthia; 11 miles S.W. of Clagenfurt.

PROVOCATIVE, in *Physic*, a medicine which strengthens nature, and stimulates or incites to venery. Such are cantharides, satyrion, &c.

PROVOCATOIRES, in *Antiquity*, a class of gladiators, supposed by Lipsius to be generally matched with the Samnites.

PROVOST, PRÆPOSITUS, an officer, of whom there are divers kinds; civil, military, &c.

PROVOST of the City, or of the Merchants, is the chief municipal magistrate in several considerable trading cities; particularly Edinburgh, Paris, and Lyons; much the same with the mayor in other places.

The provost presides at the city courts, and, together with the sheriffs, or bailiffs, decides all differences relating to trade and merchandize: he takes cognizance of the affairs of officers of policy of the city, with regard to their functions; of the delinquencies of merchants, commissioners, and factors; inspects the ports, rivers, duties, imposts, &c.

Authors attribute the institution of provost of the merchants of Paris to Philip Auguste. Du Haillan refers its epocha to the year 1190.

The provost of Edinburgh has the title of *lord*; the bailiffs are his deputies. He calls conventions of the boroughs by his own missives.

PROVOST, or Prevot Royal, also denotes a sort of inferior judge established throughout France, for the taking cognizance of all civil, personal, real, and mixt causes, among the people; but without any jurisdiction in the causes of nobles.

These, in the Bourbonnois, Auvergne, &c. are called *chatelains*; in Normandy, *vicomptes*; in Languedoc and Provence, *viguiers*.

Grand PROVOST of France, or of the Household, an officer who, in the old regime, had jurisdiction in the king's house, and over the officers in it; he looks to the policy and regulation of it, the rates of provisions following the court, &c. He was anciently called *roi des ribauds*.

Grand PROVOST of the Constable, a judge of the sword, who managed processes against the soldiers in the army, who had committed any crime.

He had four lieutenants, distributed throughout the armies, called *provosts of the army*; and particularly *provosts* in the several regiments.

PROVOST Guard. See **GUARD**.

PROVOST-Marshal of an Army, is an officer appointed to seize and secure deserters, marauders, soldiers straggling beyond the limits of the camp, and all other criminals.

The provost-marshal is to go often abroad round the army to hinder the soldiers from pillaging. It is his office to indict offenders, and to see the sentence passed upon them executed.

He likewise regulates the weights and measures, and the price of all provisions, &c. in the army, when in the field. For the discharge of his office, he has a lieutenant, a clerk, and a troop of provosts of marshals men on horseback; a serjeant's guard, and sometimes a subaltern's guard; as also an executioner. The provost-marshal, or chief provost of the army, seems to have been formerly an office of much greater rank and authority than it is now. At present, the office of provost-marshal is executed by the adjutant, whose duty it is to see all sentences of regimental courts marshal inflicted.

There is also a provost-marshal in the navy, who hath charge of the prisoners taken at sea.

The French have a *provost-general of the marines*, who is to prosecute the marines when guilty of any crime, and to make report of it to the council of war; besides a *marine provost* in every vessel, who is a kind of gaoler, and takes the prisoners into his care, and keeps the vessel clean.

PROVOSTS of the Marshals are a kind of lieutenants of the marshals of France, established for the security of the country against rogues, vagabonds, and deserters.

They take cognizance of royal causes; which, for this reason, are called *prevotal causes*. Such are all crimes com-

mitted by strollers, or people without any fixed abode; robberies on the highway, infraction of safeguard, burnings, &c. They pronounce *en dernier ressort*, or without appeal.

There are a hundred and eighty seats of these provosts in France; their chief jurisdiction regards highwaymen, footpads, housebreakers, &c. They correspond to the officers established by Augustus and Tiberius, called, as Cujas tells us, *latrunculatores*, to shew that their office was to pursue thieves.

PROVOST of the Mint is a particular judge instituted for the apprehending and prosecuting false coiners.

PROW, PRORA, in *Navigation*, denotes the head or fore-part of a ship; being that which is opposite to the poop or stern.

In front of it is the beak that cuts the water to make way for the vessel.

The prow is lower than the poop, and contains fewer stories or decks. On the beak is usually some figure or hieroglyphic, which often gives name to the vessel.

PROW, in strictness, is only that part of the fore-castle which is aloof, and not in the hold; particularly that part between the chafe and the loof.

The ancients represented beaks of birds in the prows of their ships, whence they were called *rostra*.

Prow is also a name given by seamen to the beak or pointed cut-water of a polacre, xebec, or galley. The upper part of the prow in those vessels is usually furnished with a grating platform for the convenience of the seamen, who walk out to perform whatever is necessary about the sails or rigging, or the bowsprit.

PROX, in *Natural History*, a name given by Aristotle to the *cervus platyceros*, or broad horned stag.

PROXENETA, or PROXENETES, a kind of broker or agent, who transacts between two persons. See **BROKER**, and **AGENT**.

The word is Greek, *προξενητης*, *q. d. conciliator* or *pararius, reconciler* or *mediator*. The Latins give them a more honourable appellation, calling them *interpreters*.

The term *proxeneta* is chiefly applied to those who negotiate offices, marriages, &c.

The Roman law grants the *proxenetæ* an action for recovery of their hire or wages.

These made a kind of office or college in Rome: to them the fathers addressed themselves, to sound and examine the inclinations of the young men they intended for their daughters. A commentator on the Digest accounts it a great defect in the modern policy, that there are not now any of these *proxenetæ*, or match-makers, established by public authority.

PROXIMITY, PROXIMITAS, denotes the relation or nearness either in respect of place, blood, or alliance.

PROXY, PROCURATOR, a deputy, or person who officiates in the room of another.

Princes are usually married by proxies, or representatives.

Peers are allowed to give their votes by proxies.

PROXY, Procuracy, among *Civilians*, also denotes a commission given to a proctor, by a client, to manage a cause in his behalf.

PROYART, in *Geography*, a town of France, in the department of the Somme; 10 miles W.S.W. of Péronne.

PRASN, or PRASN, a town of the duchy of Warfaw; 48 miles N. of Warfaw.

PRUAT. See **PROVAT**.

PRUCK, a town of the duchy of Stiria, on the left bank of the Muehr; 20 miles N.N.W. of Gratz. N. lat. 47° 27', E. long. 15° 8'.

PRUCK. See BRUCK.

PRUCREOS, a cape on the coast of New Spain, in the South sea.

PRUDENCE, in *Ethics*, may be defined an ability of judging what is best, in the choice both of ends and means. According to the definition of the Roman moralist, (*De Officiis*, lib. i. cap. 43.) prudence is the knowledge of what is to be desired or avoided. Accordingly, he makes *prudencia* (*De Legibus*, lib. i.) to be a contraction of *providentia*, or foresight. Plato (*De Legibus*, lib. iii.) calls this the leading virtue; and Juvenal, *Sat. x.* observes,

“Nullum numen abest si sit prudentia.”

The idea of prudence includes *εὐβουλία*, or due consultation, that is, concerning such things as demand consultation, in a right manner, and for a competent time, that the resolution taken up may be neither too precipitate nor too slow; and *συνεσις*, or a faculty of discerning proper means when they occur; and to the perfection of prudence, these three things are farther required, *viz.* *δαιμονία*, or natural sagacity; *αγχινοα*, presence of mind, or a ready turn of thought; and *αμπνηρία*, or experience. The extremes of prudence are craft or cunning on the one hand, which is the pursuit of an ill end by direct and proper though not honest means; and folly on the other, which is either a mistake, both as to the end and means, or prosecuting a good end by foreign and improper means. *Grove's Moral Philosophy*, vol. ii. chap. 2.

PRUDENCE, in *Geography*, a small island, lying N. of Canonicut in Narraganset bay, and belonging to the town of Portsmouth, in Newport county, Rhode island.

PRUDENTIUS, AURELIUS, in *Biography*, surnamed Clemens, a Latin poet of the fourth century, was born in Spain, probably at Saragossa, about the year 348. He was brought up to the bar, and became chief magistrate in two considerable cities. He also served in the army, and obtained honourable employment at the court of Honorius. This is all that is known of his personal history. He was a zealous Christian, and his poetical talents were devoted to the service of his religion. His compositions are chiefly valuable as documents of Christian antiquity, for their defects of style and versification exclude them from the list of classics even of a low order. They consist of “*Psycho-machia*,” or the soul's combat: “*Cathemerinon*,” or hymns for festivals: “*Apotheosis*,” or on the Deity, against heretics, &c. Of the editions of Prudentius, some of the best are those of Heinsius, *Lug. Bat.* 2 vols. 12mo. 1667; and the Delphin 1687.

PRUDENZA, Ital. in *Music*, a term of caution at the beginning of a difficult movement, lest in playing it at sight, a performer should begin more rapidly than he shall be able to sustain. *Con prudenza*, therefore, points out the danger. *Al suo commodo* is of the same import.

PRUINA, in *Physiology*. See HOAR FROST.

PRUM, in *Geography*, a town of France, and principal place of a district, in the department of the Sarre; 24 miles N. of Treves. The place contains 1072, and the canton 4699 inhabitants, in 42 communes.—Also, a river of France, which rises about four miles from the town of Prum, and runs into the Sour, eight miles N.W. of Treves.

PRUMBACH, a town of Bohemia, in the circle of Saatz; eight miles N. of Eger.

PRUNAY, a town of France, in the department of the Aube; 12 miles N.W. of Troyes.

PRUNE-TREE, in *Botany*. See PRUNUS.

PRUNE, *Willd.* See SLOE.

PRUNELLA, in *Botany*, a barbarous name softened down by Linnæus from *Brunella* of some authors, and so

called from the German *die Breune*, a disorder in the jaws and throat, which this plant is said to cure. Its English name *Self-heal* is of uncertain origin.—*Linn. Gen.* 301. *Schreb.* 397. *Willd. Sp. Pl.* v. 3. 176. *Mart. Mill Dict.* v. 3. *Sm. Fl. Brit.* 646. *Ait. Hort. Kew.* v. 3. 429. *Pursh.* v. 2. 402. *Brown Prodr.* 507. (*Brunella*; *Tournef. t.* 84. *Juss.* 116. *Lamarck Dict.* v. 1. 472. *Illustr. t.* 516.)—Class and order, *Didynamia Gymnospermia*. *Nat. Ord. Verticillata*, *Linn. Labiata*, *Juss.*

Gen. Ch. *Cal.* Perianth inferior, of one leaf, two-lipped, shorter than the throat, permanent; upper lip flat, rather wide, truncated, slightly three-toothed; lower lip erect, narrower, acute, cloven half way down. *Cor.* of one petal, gaping; tube short, cylindrical; throat oblong; upper lip concave, undivided, drooping; lower reflexed, obtuse, cloven into three segments, of which the middle one is broader, emarginate, serrated, concave. *Stam.* Filaments four, awl-shaped, forked at the top, two of them a little longer than the others; anthers simple, inserted into the filaments below the top, as it were on another branch. *Pist.* Germen superior, four-cleft; style thread-shaped, with the stamens incurved by the upper lip; stigma cloven. *Peric.* none, except the closed calyx, which encloses four, nearly ovate seeds.

Obj. The great peculiarity of this genus consists in its having forked filaments like *Crambe*, and the middle segment of its lower lip toothed as in *Nepeta*.

Ess. Ch. Filaments forked, one point bearing the anther. Stigma cloven.

1. *P. vulgaris*. Common Self-heal. *Linn. Sp. Pl.* 837. *Engl. Bot. t.* 961. *Curt. Lond. fasc.* 4. t. 42. *Mart. Rust. t.* 137.—“All the leaves ovate-oblong, on foot-stalks.”—Common in meadows and pastures, flowering in June and July. *Root* perennial, fibrous, somewhat creeping. *Stem* generally branched, furnished with erect, white hairs. *Leaves* ovate-oblong, rather obtuse, hairy, slightly toothed or wavy. *Spikes* terminal, solitary, cylindrical, whorled, blunt, dense, with a pair of leaves at their base; each whorl having a pair of kidney-shaped, coloured, fringed bractæas. *Flowers* of a violet hue, occasionally red and white.

2. *P. grandiflora*. Great-flowered Self-heal. *Willd. n. 2.* *Curt. Mag. t.* 337. *Jacq. Austr. t.* 377. (*P. vulgaris* β; *Linn. Sp. Pl.* 837.)—Lower leaves stalked, oblong-ovate, toothed at the base. Upper lip of the calyx trifid. *Stem* ascending.—Native of the Alps, and various other parts of Europe, flowering in July and August. This large and showy species was considered by Linnæus merely as a variety of the common one, but later authors have determined it to be distinct, its stems being constantly lower, leaves more tender, and flowers twice as large. *Stems* about six inches long, erect, slightly angular, hairy. *Leaves* entire, or slightly toothed, bright green; upper ones almost lacinated. *Spike* looser, more ovate. *Flowers* large and handsome, of a rich blue or purplish colour. Mr. Aiton in the first edition of his *Hortus Kewensis* followed Linnæus in making this species a variety of *P. vulgaris*, but in the second edition of that work he has made it a distinct species.

3. *P. laciniata*. Jagged-leaved Self-heal. *Linn. Sp. Pl.* 837. *Sm. Prodr. Fl. Græc. Sibth. v. 1.* 426. *Jacq. Austr. t.* 378. (*P. grandiflora* β; *Willd. n. 2.* *Ait. Hort. Kew. v. 3.* 430.)—Leaves ovate-oblong, stalked; the upper four or six lanceolate, toothed.—Native of mountains, and dry pastures, in various parts of Europe, frequently intermixed, as Jacquin informs us, with the last. It flowers from July to September. *Root* perennial, fibrous, creeping. *Stems* hard, small, branched, from three to six inches

inches high. *Leaves* more or less lacinated and hairy. *Flowers* larger than in *P. vulgaris*, but less than those of the last species, of a yellowish-white colour. It is subject to vary in its leaves, and the colour of its flowers. Linnæus considered this species as differing very little from the common sort.

4. *P. byssopifolia*. Hyssop-leaved Self-heal. Linn. Sp. Pl. 837. (*Brunella angustifolia integra hirsutior*; Morif. Hist. v. 3. 364. sect. 11. t. 5. f. 7.)—*Leaves* sessile, lanceolate, entire, rough. *Stem* erect.—Native of the south of France, about Montpellier, flowering from July to October.—*Stem* erect, firm and little branched. *Leaves* narrow, oblong, entire, hairy, on short stalks. *Flowers* large, generally blue, but occasionally white; the keel of the upper lip of the corolla is hairy.

5. *P. pennsylvanica*. Pennsylvanian Self-heal. Willd. Hort. Berol. 9. Ait. Hort. Kew. v. 3. 430.—*Leaves* flaked, ovate-lanceolate, toothed at the base. Lips of the calyx equal; the upper one truncated, with three awns. *Stem* ascending.—Native of Pennsylvania, received from thence by M. Thouin in 1801. It flowers from July to September.—We adopt this new species on the authority of the above quoted authors, but are not acquainted either with a specimen, figure, or description of it.

PRUNELLA, a name given by some physicians to a dryness of the tongue and throat, happening in continued fevers, especially acute ones, accompanied with a heat and redness of the throat, and a scurf covering the tongue; sometimes whitish, and sometimes blackish.

Some also give the name *prunella* to the quinzy, and others to the aphthæ.

PRUNELLÆ, *Sal*, in *Pharmacy*, is a preparation of purified saltpetre; called also *lapis prunellæ*, and crystal mineral.

It is prepared by separating and absorbing some of the more volatile parts of the saltpetre, which is done by burning upon it, when melted in a crucible over the fire, about a twenty-fourth part of its weight of flowers of brimstone. When the deflagration is over, the melted salt is poured into clean, dry, warm, brass moulds, so as to form it into little cakes.

It is given to cool, and provoke urine, in fevers and quinzies; though some think that saltpetre, purified three or four times, would be a better medicine.

The sal *prunellæ* is said to be frequently adulterated with alum; and that the deceit is known by its whiteness and glittering.

PRUNES, PRUNA, are plums dried or baked in an oven, or in the sun. See PRUNUS.

Three sorts of this fruit are ranked among the articles of the materia medica; they are all met with in our gardens; but the shops are supplied with them, moderately dried, from abroad. These are the Brignole plum, or *prunellæ*, brought from Brignole in Provence, of a reddish-yellow colour, and a very grateful, sweet, subacid taste; the common, or French prunes, called by our gardeners the little black damask plum; and damsons, the larger damask violet plum of Tours, which is seldom kept in the shops, but has been generally supplied by the common prunes. All these fruits possess the same general qualities with the other summer fruits. They are nearly inodorous; and contain chiefly mucus, saccharine matter, and malic acid. The *prunelloes*, in which the sweetness has a greater mixture of acidity than in the other sorts, are used as mild refrigerants in fevers and other hot indispositions, and are sometimes kept in the mouth for alleviating thirst in hydropic cases. The French prunes and damsons are the

most emollient, lubricative, and laxative, they are taken by themselves for gently loosening the belly in costive habits, and where there is a tendency to inflammation; decoctions of them afford an useful basis for laxative or purging mixtures, and the pulp in substance for electuaries. Lewis.

PRUNES, *Island of*, in *Geography*, a small island near the E. coast of Madagascar. S. lat. 18°. E. long. 49° 48'.

PRUNES, a river of Louisiana, which runs into the Mississippi, N. lat. 35° 33'. W. long. 90° 26'.

PRUNIFEROUS TREES, or *Sbrubs*, the plum-bearing kind, are those whose fruit are pretty large and soft, with a stone in the middle.

In this kind the flower adheres to the bottom of the base of the fruit.

PRUNING, in *Rural Economy*, the lopping or cutting out branches or boughs of trees of the fruit, timber, or other kinds. See ORCHARD and TIMBER.

It has been observed, that in timber plantations, and most other kinds of woods, it is highly proper and necessary to have an eye to the pruning and taking out the branches of the young trees occasionally as they advance in their growth, in the view of guarding against and preventing their shooting out and increasing in an irregular and improper manner, and thereby becoming too thick, and injuring each other by their rubbing, or by being drawn up weak and in too close a manner. The trees should therefore be now and then carefully looked over every year after the third from the time of their being planted, and such branches or other parts, headed down, taken out, or cut away in such other manner, as may appear suitable and proper for promoting their more perfect and beneficial growth and increase. And when this has been well effected, the only thing which remains further to be done, is that of encouraging proper leaders in the different trees, by means of shortening all the other branches which seem to contend with it, to nearly one-third of their length, in the intention of strengthening the main proper stem. All that is afterwards required is that of properly pruning out and thinning the more strong top-branches and shoots, as well as those side ones that are improperly situated, which is often done by a light kind of hand-bill; but it may be well accomplished by a small saw, or any other instrument of the strong cutting sort. These modes of pruning are applicable to forest-trees in general; but those of the fir and evergreen sort seldom require any thing more than the proper regulation of their leaders, as that of keeping them single where they throw out double, for the less the side branches are touched the better.

It may be further however noticed, that though the pruning of woods and plantations is in general considered to be much less necessary and essential than that of properly thinning of them, yet that it may notwithstanding in numerous instances be of great utility and advantage. Mr. Loudon has observed, that it equally corrects the extravagancies of the trees, takes off their redundancies, and directs their produce in the most proper methods. And that two trees of the same kind planted out in similar soils and situations, the one pruned, and the other left to nature, though they may produce in an equal length of time the same quantity or weight of timber; yet the tree that was pruned will contain the greater part of that timber in an upright clean bole or stem, while the other, which was left to nature, will have a great part of it in the arms and side branches. Hence, where the application or intention was that of ship-building, or any similar purpose, it is most likely the natural one would be preferred; but that where

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wainscotting or any similar use was intended, the other would unquestionably be the most profitable, and of course preferred. But even the larch, without any pruning, is supposed the best for the purpose of wainscotting; and the oak, without any pruning, the most suitable for ship-timber. These, and other cases which might be adduced, would seem to shew that trees, equally in respect to the quality of their wood, and the modes of their growth, are fitted by nature for certain particular purposes in the arts of life; and which again tends to prove that pruning is sometimes unnatural and often unnecessary. But from various and different causes and circumstances, it not unfrequently becomes necessary and proper to use trees for purposes, and intentions, which they are not designed for by nature. Anterior to the larch being introduced into this country, and in situations where it could not be obtained, it might be necessary to train the oak-tree for wainscotting uses; and where the larch alone will grow, and ship-timber is required, it may be advantageous to prune or bend it to the forms which will suit these intentions. Farther, the ash, the elm, and the beech, when planted in soils and situations which suit their different natures, are, without pruning or particular cultivation, admirably fitted for the several useful purposes to which they are applicable. But their applications and uses being reversed or intermixed, pruning then becomes necessary and essential.

In the performance of this business there are two points requisite to be particularly attended to; the first of which is the general principles of vegetation; and the second, the purposes for which the wood or timber are to be applied. In general, however, in artificial plantations, it may be a good common rule, to consider pruning as the means of throwing more timber into the trunk or principal stem, whatever direction that may have assumed by nature. Pruning, where necessary for these purposes, should commence after the trees have been five or six years planted, and continue until they are nearly full grown. In common, no tree should be divested of all its side branches; as a sufficient number of small ones should always be left in order to circulate the sap through the tree. And the branches of resinous trees never attain a timber size, which shews that their chief use is to serve this particular purpose. In the fir and pine tribe their number and importance may, it is supposed, be accounted for, from the sudden ascent of the sap, and the singular largeness of the alburnous vessels in these trees. Hence in this tribe of trees no side branches, it is thought, should be removed, until they shew some evident marks of decay, or of a tendency to be destroyed.

It is conceived that wherever the practice of pruning is much attended to, it is for the most part carried to too great a length; and that the timber is thereby very materially injured, as well as the characteristic beauty of the trees. The just and useful medium in this sort of work is but very seldom had recourse to, the trees being too frequently either wholly left to contend with whatever kinds of injuries or diseases may come in their way, or so much mutilated and deformed by the hands and tools of the forest pruner, as to be unfit to perform their proper and necessary offices or functions: the consequence of the first of which, it is supposed, is that of *unsound* timber; and that of the second, timber of a *bad quality*, as well as perpetual deformity of shape. Better proof of which cannot be afforded than in the tall, naked elms, pollard oaks, and naked fir woods, which prevail in many parts of this country, and not unfrequently disfigure whole districts of it. The timber of those sorts of trees, as is extremely well known, is, where they are treated in a proper and suitable manner, the

best and most valuable of any; but that after the above kind of management has been practised with them, both its quality and quantity are very greatly injured, impaired, and lessened; so that being rendered unfit and improper for every sort of valuable purpose, it is not unfrequently employed for use as fire-wood.

From this view of the subject, the great value and utility of moderate and judicious pruning in forest-woods and plantations is particularly evident, and the impropriety and disadvantages of carrying it too far fully pointed out and explained.

In the business of reclaiming and preserving all sorts of old woods and plantations, which have suffered from neglect and inattention, pruning in a proper manner should always accompany the various other means which are necessary for these purposes, according to the times of the growths, the dimensions, and the kinds of the trees, as well as the purposes that they are intended for.

It is supposed by Mr. Loudon, that in the management of all sorts of wood, in the view of ornament, pruning serves many important purposes. Where there are individual trees upon the lawns, or near to the houses, of heavy inelegant forms, they may often be lightened, and reduced to more desirable and agreeable shapes, either by cutting out branches, or by incisions made in the bark and outer layers of the wood, in order to force young shoots to spring out. The stems of single trees may be shewn to advantage, or be disguised where they are too formal. Small groups may also be improved in the same manner. And in connection with the knife, cords and weights may not unfrequently be had recourse to with good effects; as by these means, branches may be more gracefully and conveniently bent and directed, by hanging stones towards their extremities; or their positions may be altered, by fixing them with cords either to other branches, or the trunks of the main trees, or to posts driven into the ground for that purpose. In this way, awkward and mishapen trees, which could ill afford or admit of being thinned, may, it is asserted, be *balanced*, without cutting off any of their branches. Likewise close formal trees may be rendered irregular, by separating their boughs. And the stems of trees may be formed and moulded into more pleasing and agreeable bends or curves, in scenes of beauty and ornament; or be rift, shattered, or broken, in those of the grotesque or romantic kinds. Farther, the sky line of a plantation, too insipid from being deficient in variety, may, it is contended, be rendered interesting; or one which is composed of firs, that is displeasing from the formality of their conic tops, may be changed by taking away some trees entirely, and cutting the tops from others. Even the last of these operations may also be applied to conic trees, when they are too prevalent upon lawns, or in parks, and where they do not group well with buildings. It must, however, be allowed, that this is destroying the natural character of the trees; but the conical form of the fir is a singular character in trees, and in harmonizing scenery, general excellencies are to be chiefly attended to. It is asserted that many of these operations are executed with excellent effect at Foxley; and in some other places likewise, under the direction of the writer, where the formality of trees not pruned at all, and of others pruned only to a certain height by cattle, were equally disguised, and rendered imperceptible. See PLANTATION, PLANTING, and WOOD.

PRUNING of Trees, in Gardening, the operation of occasionally cutting out parts, in order to give them any desired form, and to retrench or reduce irregular and redundant or superfluous growths.

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It is particularly necessary to be practised on many sorts of fruit-trees, more especially the dwarf sorts; such as all kinds of wall and espalier fruit-trees. It is also necessary, occasionally, for standard trees, both dwarfs and half and full standards, and for some sorts annually, as all kinds of wall-trees, espaliers, and most other dwarf or trained fruit-trees; which is done in order to preserve the proper figure, and to keep them within their limited bounds, as well as to promote fruitfulness. But as to common standards, whose heads have full scope of growth every way, they require but very little pruning, except just to retrench any occasional redundancy, ill-growing branches, and dead wood. Wall-trees and espaliers require a general regulation in this way, twice every year: in summer, to retrench the evidently superfluous and ill-placed shoots of the year, and to train in a supply of the most regular ones; and in winter, to give a general regulation both for the supply of young wood left in summer, and to the old branches where necessary.

In pruning these sorts of trees, as they have their branches arranged with regularity to the right and left, one above another, in a parallel manner, four, five, or six inches asunder, and forming a regular spread, so as the branches of each tree completely cover a certain space of wall, &c.; and as the whole spread of branches constantly sends forth every year a great number of unnecessary and useless shoots, each should be limited to a certain space. An annual pruning is consequently necessary to retrench the redundancies, and all irregular and bad shoots, to give the proper bearing branches due room, as well as to confine each tree within its proper limit, consistent with its regular form.

The first pruning for wall fruit-trees, to give the head its first regular formation, is effected by pruning short, or heading down in spring all the shoots produced the first year from budding and grafting; and when a year old, being mostly pruned down in March, within four or five eyes of the bottom, to throw the sap more into the remaining lower buds; and thus, instead of running up to one stem, to push forth several strong shoots from the lower part the ensuing summer, so as to fill the necessary space of walling and espalier regularly from the bottom; which shoots being trained straight and regular in a spreading manner, each at full length all summer. And in the winter or spring following, where a supply of more principal shoots shall seem necessary to form the head more effectually, pruning short also these shoots, each to four or five eyes, when they will throw out the same number of shoots the same year, which, according as they advance in length, should be trained at regular distances at full length, during the summer; for the shoots of wall-trees should not in general be shortened in the summer season, as that would cause them to push forth many superfluous unnecessary lateral shoots; though, sometimes, in order to fill a vacancy as soon as possible, strong young shoots, by being pinched or pruned early in the season, as May or beginning of June, to four or five eyes, will throw out several proper shoots the same summer. The work of pruning short should be occasionally repeated one or two years, either in general or on particular shoots, as may seem necessary, till a proper set of branches are by that means obtained, to give the head of the tree a proper formation: afterwards it may be omitted, except occasionally to any particular shoot to fill a vacant space; but some sorts of wall-trees require almost a general shortening of their supply of shoots, such as peaches, nectarines, &c. which bear only on the young wood, have that of each year shortened, to force out a supply of shoots for future bearing. Other sorts of wall-trees and espaliers

are not, in the general course of pruning, to be shortened, such as pears, apples, plums, and cherries, which continue bearing in the same wood of from two or three to many years' growth. See *ESPALIERS*.

When the trees have been thus furnished with a proper spread of branches, trained regularly to the wall and espalier, they every year throw out many more shoots than are wanted, or can be converted to use, by some being too numerous, others ill placed, and others of a bad growth; all of which must, therefore, be regulated accordingly by proper pruning: as the regular figure of the tree, by being well furnished in every part equally from the bottom to the top of the wall or espalier with proper branches, capable of producing good fruit, is the principal object of this operation.

In performing it, the operator should be careful to free the trees of every thing that is superfluous, irregular, or hurtful, both in the summer and winter prunings. Those branches are superfluous, which though good and well placed, are more than wanted, or that can be properly laid in; and those irregular, which are so ill placed as not to be trained with regularity to the wall or espalier, such as all fore-right shoots, being such as grow immediately from the front or back of the branches in a fore-right direction; and those are hurtful, which are of bad growth, such as all very rank or singularly luxuriant rude shoots. The superfluous or redundant growths should of course be thinned, by pruning out all that seem to cause confusion; and the irregular and hurtful rank shoots be displaced, cutting all those off quite close to the place whence they proceed, only leaving a proper supply of the regular or best placed side shoots where necessary, so as to preserve every part well furnished with bearing wood, trained straight and close to the wall or espalier, at equal distances. Some sorts of wall-trees, &c. however, require a general annual supply of young wood, such as peach, and all other trees which bear only on the shoots of a year old; others require only an occasional supply of wood, such as apples, pears, &c., and all other kinds that bear on the old wood of from two or three to ten or twenty years old, or more; so that the same branches continue in bearing many years, and the trees require only a supply of young shoots now and then, to replace any worn out or dead branches. See *Summer and Winter Pruning*.

This art chiefly consists in being acquainted with the nature of bearing in the different sorts of trees, and in forming an early judgment of the future event of shoots and branches, as well as other circumstances, for which some rules may be given; but there are particular instances which cannot be judged of but upon the spot, and depend chiefly upon practice and observation.

With regard to the nature or mode of bearing of the different sorts of wall and espalier trees, &c. peaches, nectarines, apricots, &c. all produce their fruit principally upon the young wood of a year old; that is, the shoots produced this year bear fruit the year following, and the same of every year's shoots; so that in all these trees, a general supply of the best regular shoots of each year should be every where preserved, both in the summer and winter prunings, at regular distances, quite from the bottom to the extremity of the trees on every side, in such order as to seem coming up regularly one after another, and trained principally at full length during their summer's growth; but in the winter pruning generally shortened, according to the strength of the different shoots, in order to promote their throwing out more effectually a supply of young wood the ensuing summer, from the lateral eyes, in proper places for training in for the next year's bearing; the fruit-buds
being

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being mostly produced along their sides immediately from the eyes, as they rarely form any considerable fruit-spurs, as in the apple, pear, &c.; the same shoots producing the fruit, and a supply of shoots at the same time for the succeeding year's bearing. All these trees also bear on casual small natural spurs, sometimes arising on the two and three years' wood, one or two inches in length, which are generally well furnished with blossom buds in the proper season, and should be preserved for bearing; always, however, depending on the main young shoots as the principal bearers.

Vines also produce their fruit always upon the young wood, shoots of the same year arising from the eyes of the last year's wood only, and must therefore have a general supply of the best regular shoots of each year trained in, which in the winter pruning should be shortened to a few eyes or joints, in order to force out shoots from their lower parts only, properly situated to lay in for bearing fruit the following year.

Figs bear also only upon the young wood of a year old, a general supply of it is of course necessary every year; but these shoots should at no time be shortened, unless the ends are dead, as they always bear principally towards the extreme part of the shoots, which if shortened would take the bearing or fruitful parts away. And these trees mostly throw out naturally a sufficient supply of shoots every year for future bearing without the precaution of shortening them.

And as to apple, pear, plum, and cherry trees, they bear principally on spurs arising in the general branches, of from two or three to ten or twenty years old, the same branches and spurs continuing bearing a great number of years, as has been seen, so that having once procured a proper set of branches, in the manner already directed, to form a spreading head, no further supply of wood is wanted than only some occasional shoots now and then to supply the place of any casual worn-out or dead branch as before suggested; these spurs or fruit-buds are short, robust shoots, of from about half an inch to one or two inches long, arising naturally in these trees, first towards the once extreme parts of the branches of two or three years old; and as the branch increases in length, the number of fruit-buds increases likewise; this therefore determines, that in the general course of pruning all these kind of trees, their branches that are trained in for bearing must not be pruned or shortened, but trained at full length, as where shortened it would divest them of the parts where fruit-buds would have first appeared, and, instead thereof, would throw out a number of strong unnecessary wood-shoots from all the remaining eyes; therefore all the shoots or branches of these trees should be trained principally at full length, and as they advance still continue them entire. When however there is a vacancy, and only one shoot, where two or three may be requisite, pruning or shortening is allowable to force out the proper supply. See *DWARF-Trees*.

In these trees care is necessary to preserve all the proper fruit-buds or spurs, which are readily distinguished by their short, thick, robust growth, rarely exceeding one or two inches in length.

In the course of pruning all sorts of wall and espalier trees, all improper and ineffectual shoots and branches, necessary to be displaced, must be taken off quite close to the place whence they arise; which in the summer pruning, if attended to early, while the shoots are young and tender, may readily be rubbed off close with the thumb; but when the shoots become older and woody, as they do not readily break, it must be done with a knife, cutting them as close

as possible: all winter pruning should however be performed with a knife.

In pruning in summer, the necessary supply of regular shoots that are left for training in, should never be shortened, unless to particular shoots to fill a vacancy, or to reduce within bounds any too long extended shoots; as by a general shortening in this season, all the shoots so treated would soon push again vigorously from every eye, and run the trees into a perfect thicket of useless wood; therefore all sorts, whether they require shortening in the winter pruning or not, should in the summer dressing be laid in at full length.

Summer Pruning.—This is a necessary operation, as in spring and summer wall and espalier trees abound with a great number of young shoots that require thinning and other reforms to preserve the requisite regularity and beauty of the trees, and encourage the fruit; and the sooner it is performed the better; it is therefore advisable to begin in May or early in the following month, and disburthen the trees in time of all redundant or superfluous growth, and ill-placed and improper or bad shoots; which may be then performed with more expedition and exactness than when delayed till after the trees have shot a considerable length and run into confusion and disorder: besides, the injury of the fruit is prevented. It is therefore of importance to proceed in this operation early, when the same year's shoots are sufficiently formed to enable you to make a proper choice.

The business now is to thin and regulate the unnecessary shoots, by pruning away the superfluous ones, and all such as are ill-placed and of bad growth, retrenching the most irregular-placed, weakest, and all such as are evidently not wanted for use, and where two or more shoots any where arise from the same eye, clearing all away but one of the best, reserving a sufficiency of the moderately strong and most regular-placed side shoots, and always a leading one at the end of every branch, where it commodiously occurs; all of which should be retained to be regularly trained in to choose from in the winter pruning, leaving more or less in proportion, according to what the trees are, or the mode of bearing, though in all those trees that bear always on the young wood, at least doubly or trebly more shoots should be left in this pruning than what may appear necessary, especially of peaches, nectarines, apricots, vines, figs, &c. as it is highly requisite to reserve plenty of regular young wood in summer, to choose from in winter pruning, to lay in for next year's bearers; but as to apples, pears, plums, cherries, &c. which continue bearing many years on the same branches, only here and there some good well-placed shoots need be left towards the lower parts, or in any vacancy between the main branches till winter; and if then not wanted, be easily retrenched.

Where, however, a tree is in general inclined to luxuriance, it is proper to retain as many of the regular shoots as can be commodiously trained in with any regularity, in order to divide and exhaust the too abundant sap, which causes the luxuriance; as by humouring somewhat the natural inclination of luxuriant trees by leaving plenty of branches, and these mostly at full length, they may the most readily be reduced to a more moderate state of growth.

Great attention should always be paid to the lower parts of the trees, as it is frequently the case to find proper shoots arising in places necessary to be trained in, either to supply a present or future vacancy, or as a reserve to replace any decayed or worn-out or other bad branch, so that if moderately strong well-placed shoots arise in such parts, they are to be particularly regarded at this time; and in winter pruning,

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ing, such of them as are not wanted may be easily cut out and removed: but all weak trifling shoots should now be taken out.

After having summer-pruned and cleared any tree from all useless shoots, all the remaining proper shoots should be directly, or as soon as they are long enough, trained in straight and close to the wall or espaliers, at full length. When there is any great vacancy in some particular part, it may however be proper to cut or prune one or more contiguous shoots to three, four, or five eyes or buds, in order to promote an emission of laterals accordingly the same season, more effectually to supply the vacant spaces; but all the rest should be trained at full length till winter pruning, when they must undergo another regulation. Those of such trees as require it, as peach, nectarine, &c. should be shortened.

The work of training in the shoots in this season, is performed when against walls, both by nailing, by means of proper shreds and nails, and occasionally, by fastening in the smaller shoots, with little sticks or twigs stuck between the main branches and the wall; and for espaliers, by tying them with small osiers, rushes, or bafs strings.

After having thus summer-dressed and trained the trees, it will be necessary to look them occasionally over, in order to reform such branches or shoots as may have started from their places, or taken a wrong direction, and according as any fresh irregular shoots are produced, they should be displaced; and likewise, as the already trained shoots advance in length or project from the wall or espalier, be trained in close, continuing them at full length during their summer's growth; every thing being kept close and regular, by which the trees will appear beautiful to the eye, and the fruit shew itself, and attain its due perfection more effectually.

Winter Pruning.—In this pruning, a general regulation must be produced both in the mother branches, and the supply of young wood laid in the preceding summer. The proper time for this work is, in most wall-trees, any time in open weather, from the fall of the leaf in November until March. And in performing the business, it is proper to unnailed or loosen a great part of the branches, particularly of peaches, nectarines, apricots, vines, and such other trees as require an annual supply of young wood, and considerable regulation in the regular branches.

All the principal or mother branches should first be looked over, and examined, to see if any are worn out or not furnished with parts proper for bearing fruit, and such branches be cut down either to the great branch from which they proceed, or to any lower shoot or good branch they may support toward their bottom part, leaving these to supply its place; likewise examining if any branches are become too long for the allotted space either at the sides or top, and reforming them accordingly, by shortening them down to some lower shoot or branch properly situated to supply the place; being careful that every branch terminates in a young shoot of some sort for a leader, especially in all parts where room to extend them, according as the limited space admits, having the leader either placed naturally at the termination of the branch; or where too long in any particular parts of the tree, pruned conformably to some lower shoot, &c. so as that it may still terminate in a proper leader, and the extended branches not cut to naked stumpy or stubbed ends, as is often practised by inexperienced pruners. And from the principal or larger branches, pass to the young wood of the year: or, in proceeding both in the occasional reform among the principal or older branches, and more general regulation in the young wood of the year,

or shoots of the preceding summer, the above intimations relative to the principal branches should be observed in the pruning of the whole, both on the old and young wood, and be carried on regularly together at the same time; cutting out or retaining according to circumstances; as for instance, in older wood observing the above particulars, and as below, and in the general supply of young wood, cutting out close all fore-right and other irregular shoots that may have been omitted in the summer-pruning; likewise all very weak shoots, and those of very luxuriant growth, unless it be necessary to keep some to supply a vacant place; then of the remaining regular shoots, selecting a greater or smaller portion to leave either as a general supply for next year's bearing, as is requisite for peaches, nectarines, apricots, vines, and figs; or only in others some occasional shoots, such as in full trained apple, pear, plum, and cherry-trees, &c. either to furnish casual vacancies, or to supply the places of any defective or improper branches, or ineffectual bearers, as may casually occur, or that of decayed or dead wood.

But as peaches, nectarines, apricots, vines, and figs, always bear principally on the year-old wood, as already noticed, a general supply of young shoots must be left in every part, from bottom to top, at regular distances; and, at the same time, some proportional part of the most naked old wood, and of the two preceding years past bearers, be pruned out to make proper room for this requisite young successional supply of future bearers in the following summer, to be now retained in a general manner, both laterally, and as terminals to the general parent branches, which should be pruned accordingly; and mostly all the said supply of the present retained shoots, except the fig, must be more or less shortened, according to their situation and strength, to encourage their furnishing more readily a proper supply of shoots in spring and summer for the succeeding year's bearing, as noticed before, leaving the strongest shoots always the longest, as is more fully explained under each of their respective genera; but as the figs always bear towards the end of the shoots, they must not be shortened.

With respect to the apples, pears, plums, cherries, &c. as they continue to bear on the same branches of from two or three to many years standing, the said bearers must be continued accordingly; and the trees only require an occasional supply of young wood, according as any of the branches become defective, or unfit for bearing, and want removing; which should now be cut out as may seem necessary, training in here and there, in proper places, some good regular young shoots towards the lower part, and where it may seem necessary, to be coming gradually forward to a bearing state, to be ready to replace worn-out and other useless branches to be cut out, as they may occur: and of the young wood, selecting what may appear necessary of the best well-placed shoots, and the superabundance, or those not wanted for that purpose, together with all irregular-placed shoots, rank luxuriant, and other ineffectual growths, should now be cut clean out, close to whence they originate, not leaving any spur or stump, as every one would push out several strong unnecessary shoots the next spring, to the prejudice of the trees and fruit: particular regard should be paid to preserve the shoots at the termination of all the already trained branches entire, but not more than one to terminate each branch; preserving also carefully all the proper fruit-spurs, taking care that the supply of young wood be occasionally reserved, and the branches in general of these trees be trained in at full length, and continued so in future, as far as the limited space will admit: and according as any extend above the wall or espalier, or any where beyond their

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proper limits, they be pruned down with discretion to some convenient bud, or lateral shoot, or lower branch, which should be trimmed entire.

In this pruning, as in the summer dressing, it is of importance to have a strict eye to the lower parts of wall-trees, &c. to see if there is any present vacancy, or any that apparently will soon happen; in which cases, if any good shoot is situated contiguous, it should be trained in either at full length, or shortened to a few eyes, to force out two or more shoots, if they shall seem necessary; for precaution should ever be observed in taking care to have betimes a sufficient stock of young wood coming forward to fill up any casual vacancy, and substituting a new set of branches in place of such as are either decayed, or stand in need of retrenchment.

In wall-trees and espaliers there are sometimes many large disagreeable barren spurs, consisting both of old worn-out fruit-spurs, and of clusters of stumps of shortened shoots projecting considerably from the branches, occasioned by unskilful pruning, when retrenching the superabundant and irregular shoots, which, instead of being cut out close, are stumped off to an inch or two long, and in the course of a few years, form numerous barren stumps, and very little fruit, the trees appearing like a stumped hedge. In this season of pruning, in this case, it is proper to reform them as well as possible, by cutting all the most disagreeable stumps clean out close to the branches, leaving these at full length, especially in apples, pears, &c. and reserving an occasional supply of young wood in different parts: thus in two or three years such trees may be reduced to a regular figure and a proper state of bearing.

It is observed that bad pruning ruins many a good tree, as is observable in numerous gardens, where the wall-trees and espaliers appear as just described, pruned every year, yet never producing any tolerable crop of fruit.

Severe injudicious pruning in strong wood is greatly prejudicial to the health of some sorts of stone fruit-trees, by causing them to gum and soon decay. Plums and cherries, in particular, are often greatly damaged by a too severe discipline of the knife, these being very liable to gum by large amputations: it is therefore of importance to attend to these trees well in the summer pruning, to retrench all the superfluous and irregular shoots betimes in the summer, while quite young, and pinch others occasionally where wood is wanted to fill vacancies, so as to require but little pruning out of large wood in winter.

A general nailing, &c. must every year be performed, according as the pruning advances, as it is proper that every tree, as soon as pruned, be directly nailed to the wall, or if espaliers, tied or nailed to the trellage, being careful in the winter pruning, as the work of nailing, &c. will require to be performed more or less upon all the branches, to train them with great regularity, nailing them along horizontally, as straight and close as possible; never crossing any of the branches but training them distinctly and parallel from four to five or six inches asunder, or in proportion to the size of the leaves and fruit of the different sorts, making the opposite branches of each side arrange equally in the same manner and position.

Pruning of Standard Trees.—Standard fruit-trees require but very little pruning; for, as their branches have full scope above to extend themselves every way, they must not be shortened: besides, as the standard fruit-trees, consisting principally of apples, pears, plums, and cherries, bear fruit on natural spurs arising towards the upper parts of the branches, this determines that they must not be shortened, nor any other pruning be practised, than just to reform any

great irregularity, &c. in them. In these trees, the first occasional pruning necessary is the first two years of their growth, in order to form their heads somewhat regular, by retrenching any irregular shoots; and when designed to have them form more regular spreading heads, to prune the first shoots, when a year old, down to four or five eyes, in order to force out lateral shoots from these lower buds the following summer, to give the head a proper formation. After this, the branches should be suffered to take their natural growth, except that, if while the trees are young, any very luxuriant shoots ramble away considerably from all the others, and draw most of the nourishment, it is proper to prune them, either by retrenching entirely very irregular ones, or shortening others to some regularity, to branch out consistently with the requisite form of the head of the tree; but except in such cases of reducing irregularities, the heads of all kinds of standards always should be left to branch away as fast as possible, both in length, and laterally, agreeable to their natural mode of growing; and they will naturally furnish themselves abundantly with bearing wood.

In standard fruit-trees of some years growth, as irregularities and disorders will occasionally happen, they should be regulated a little by pruning out the most conspicuously irregular and redundant growths in the winter season.

For instance; where any considerable branches grow right across others, or in any other awkward direction, to incommode or cause confusion, or much irregularity in the head, they should be retrenched close; likewise any branch that rambles considerably from all the rest, should be reduced to order, by cutting it down to some convenient lower branch, so as to preserve some regularity. Where the head is considerably crowded with wood, let the worst of the redundancy be thinned out as regularly as possible, cutting them close to their origin; and as sometimes very vigorous shoots arise in the heart of the tree, or towards the bottom of the main branches, growing upright, and crowd the middle of the head, they should be constantly retrenched to their very bottom; cutting out also any very cankered parts, and all decayed wood; and clearing off all suckers from the root and stem. The standard trees, thus disburthened from any considerable irregularities and confusion, so as all the proper branches have full scope to spread free and easy in their natural manner, will not fail to repay the trouble in the superior quality of their future fruit. See *ORCHARD TREES*.

Pruning of Forest-trees, &c.—With respect to pruning of forest and ornamental trees, flowering shrubs, &c. it is very inconsiderable. Forest-trees, &c. must be suffered to run up as fast as possible, so that their heads should not be shortened; all that is necessary is, to prune off the lateral branches occasionally from the stems; or if, while young, any lateral shoot of the heads, which is of a very rude rambling growth; but otherwise suffering the top and general branches of the heads to remain entire, and take their own natural growth; only pruning the stragglers occasionally. It is, however, very improper to trim up the stems too high, as often practised to forest-trees, as scarce to leave any upper branches to form a head: never, therefore, trim the stem much higher than the full spread of the principal branches, as a full head is both ornamental and essentially necessary to the prosperity of the tree. See *PLANTING*.

And as to the shrub kinds, they should, for the general part, take their own growth at top; and only be pruned occasionally in any lower stragglers, from the inferior part of the stems, or any very irregular rambling shoot of the heads, and all dead wood. Except in these cases, their heads mostly should be suffered to shoot in their own way, according to their different modes of growth, in which they

will appear always the most agreeable. Where, however, it is required to keep shrubs low, they must be regulated, as convenient, with the pruning-knife, as being more proper than the garden-shears, which should never be used in that business to shrubs and trees in rural growth.

The particular method to be followed with each sort of tree has been shewn under the proper head to which it belongs.

Pruning Implements.—For the purpose of general pruning several implements are necessary, such as pruning-knives, saws, chisfels, hand-bills, hatchets, &c. Two or three different sizes of knives are requisite, in order to prune neatly; a strong one for cutting out larger branches, shoots, &c. and a small one for the more exact pruning among the smaller branches and shoots of peach and nectarine trees, &c. These knives are generally made curving at the point, and they should not be too long, broad, and clumsy, but have rather a shortish narrow blade, and but very moderately hooked at the point, for when too crooked, they are apt to hang in the wood, and not cut clean; it is also proper to be furnished with a strong thick-backed knife, to use by way of a chissel occasionally, in cutting out any hard stubborn stumps, &c. placing the edge on the wood, and with your nailing hammer striking the back of it, and it will readily cut through even and smooth. A long knife with a concave edge, and a pruning-knife with a convex edge, are also recommended by Mr. Forsyth.

Hand-pruning saws are likewise proper for cutting out any large branch too thick and stubborn for the knife: these should be of moderate sizes, one being quite small and narrow, in order to introduce it occasionally between the forks of the branches, to cut to exactness.

And as saws generally leave the cut rough, it is proper to smooth it with a knife or a pruning-chissel.

The pruning-chissels are necessary to use occasionally both to cut off any thick hard branches, and large hard knotty parts, or stumps, and to smooth cuts in large branches, &c. after a saw; they should be flat, and from about one to two inches broad: sometimes large strong chissels, fixed on a long pole, are used in pruning or lopping branches from the stems of high standard forest-trees, one man holding the chissel, while another, with a large mallet or beetle, strikes the end of the pole. A hand-bill and hatchet are also necessary to use occasionally among larger kinds of the standard trees.

All these pruning tools, in their proper different sizes, may be had at the cutlery shops, and of the ironmongers, and many of the nursery and seedsmen.

PRUNN, in *Geography*, a town of Austria; six miles S.S.W. of Vienna.

PRUNUS, in *Botany*, an ancient generic name occurring in Pliny and other Latin authors. It is called *περσύνη* by Theophrastus, and, according to Galen, is derived from *περσύνη*, an Asiatic word for the Wild Plum.—Linn. Gen. 249. Schreb. 336. Willd. Sp. Pl. v. 2. 984. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 526. Ait. Hort. Kew. v. 3. 196. Pursh. v. 1. 325. Michaux Boreal-Amer. v. 1. 284. Tournef. t. 398. Juss. Gen. 341. Lamarck Dict. v. 5. 663. Illustr. t. 432. Gært. t. 93. (Cerasus; Tournef. t. 401. Juss. 340. Armeniaca; Tournef. t. 399. Juss. 341. Lamarck Illustr. t. 431. Laurocerasus; Tournef. t. 43.—Class and order, *Icosandria Monogynia*. Nat. Ord. *Pomacea*, Linn. *Rosacea*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, bell-shaped, deciduous, cloven into five, obtuse, concave segments. *Cor.* Petals five, roundish, concave, large, spreading, in-

serted into the calyx by claws. *Stam.* Filaments from twenty to thirty, awl-shaped, nearly the length of the corolla, inserted into the calyx; anthers twin, short. *Pist.* Germen superior, roundish; style thread-shaped, the length of the stamens; stigma orbiculate. *Peric.* Drupa roundish. *Seed.* Nut roundish, compressed, even, with rather prominent sutures.

Eff. Ch. Calyx five-cleft, inferior. Petals five. Stone of the drupa even, with slightly prominent seams.

Obs. Of *Prunus*, which comprises, according to Linnæus, all the above quoted genera of Tournefort, only thirteen sorts occur in the *Species Plantarum*. Willdenow and Martyn each enumerate thirty-three species, from which the following are selected. The first five of these are British plants.

P. Padus. Bird Cherry. Linn. Sp. Pl. 677. Engl. Bot. t. 1383. Fl. Dan. t. 205.—Flowers in long pendulous clusters. Leaves deciduous, with two glands on the under side at the base.—Not unfrequent in woods and hedges in the north of England, flowering in May. The branches of this shrub, or small tree, are round and smooth. Leaves alternate, stalked, obovate, pointed, serrated, veined, smooth, rather glaucous, smelling like rue. *Stipulas* linear, slightly fringed, deciduous. *Clusters* on the newest branches, solitary, simple, pendent, composed of numerous snow-white blossoms. *Fruit* oval, dark purple or black, bitter, but very grateful to birds. The stone of the *drupa* is slightly rugged, not so smooth as in the other species of *Prunus*, which seems to confirm the opinion of Gærtner, that no solid difference exists between this genus and *Amygdalus*. Every part of *P. Padus* except its fruit is highly poisonous.

P. Cerasus. Cherry-tree. Linn. Sp. Pl. 679. Engl. Bot. t. 706.—Umbels nearly sessile. Leaves ovato-lanceolate, folded when young.—Native of woods and hedges, flowering in May. The branches of this tree are ash-coloured, polished and round. Leaves stalked, pointed, unequally serrated, veined; the younger ones folded, more or less downy beneath. *Stipulas* toothed, glandular. *Umbels* leafless, pendent, composed of but few blossoms, each on a long stalk. *Calyx* reflexed. *Fruit* red, justly celebrated for its highly agreeable and acid flavour. Dr. Smith, in his *Flora Britannica*, notices four varieties of the cherry, two of which have blackish and less acid, approaching to sweet, fruit. They also vary in size.

P. Domestica. Plum-tree. Linn. Sp. Pl. 680. Engl. Bot. t. 1783. Woodv. Med. Bot. t. 85.—Flower-stalks mostly solitary. Leaves lanceolate-ovate, convolute when young. Branches without spines.—Found frequently in hedges, bearing flowers in April or May.—A middling-sized tree, whose branches are unarmed. Leaves on short stalks, ovate, serrated, smooth; the younger ones downy. *Flowers* white, generally on solitary stalks. *Fruit* of a dark blue or purple colour, mostly elliptical or obovate. From this species proceed all the different varieties of plums which abound in our orchards and gardens. Parkinson mentions sixty sorts, “all which,” he says, “are to be had of my very good friend Master John Tradescant, who hath wonderfully laboured to obtain all the rarest fruits he can hear of in any place of Christendome, Turkey, yea, or the whole world.”

P. insititia. Bullace-tree. Linn. Sp. Pl. 680. Engl. Bot. t. 841.—Flower-stalks in pairs. Leaves lanceolate-ovate, convolute when young, downy beneath. Branches ending in a spine. Common in hedges and woody places, flowering in April.—This is rather a humble tree, whose branches usually terminate in a spine. Leaves alternate, on short stalks, attenuated at the base, serrated. *Flowers*

PRUNUS.

from different buds, in pairs, on simple, shortish stalks, large, white. *Fruit* globular, black with a blue bloom, very sour and austere, scarcely eatable in a crude state. Dr. Smith observes that the common white bullace cultivated for the table differs only from this, as the white currant or white elder differ from the common kinds of each.

P. spinosa. Sloe-tree. Black-thorn. Linn. Sp. Pl. 681. Engl. Bot. t. 842. Fl. Dan. t. 926. Woodv. Med. Bot. t. 84.—*Flower-stalks* solitary. *Leaves* lanceolate, smooth. *Branches* ending in a spine.—One of the most common British plants, flowering early in the spring. A low, bushy shrub, formed of numerous rigid, spreading, thorny branches, covered with a dark but glaucous bark. *Leaves* on stalks, lanceolate or inversely ovate, serrated, dark-green, not appearing till the plant has blossomed. *Flowers* solitary, each on a short stalk, white. *Fruit* globular, black, very austere, and only palatable when prepared with a great quantity of sugar. “Its expressed juice inspissated over a slow fire, is a substitute for the Egyptian Acacia, and not an unuseful astringent medicine. The recent fruit is one of the many articles used to adulterate port wine in England. The dried leaves are said to be a substitute for tea, and are, perhaps, often mixed with it in this country.” *Engl. Bot.*

P. prostrata. Dwarf Pink Plum. Billard. Syriac. fasc. 1. 15. t. 6. Willd. n. 33. Ait. n. 19. Sm. Fl. Græc. Sibth. t. 478, unpublished. (*P. cretica montana minima humifusa, flore suavè rubente*; Tourn. Cor. 43. Voyage v. 1. 19.)—*Flower-stalks* in pairs. *Leaves* ovate, deeply serrated, without glands; white and downy beneath. *Stem* diffuse.—Native of mount Lebanon, and of the loftiest mountains of Crete, which it enlivens with its copious pink blossoms, soon after the first melting of the snow. Dr. Sibthorp gathered it also on mount Parnassus. On its native rocks this plant is a spreading procumbent shrub, with a thick woody black stem. In our gardens it rises to the height of two feet, in a bushy form. The leaves are small, cut, and deeply serrated; bright green above; white beneath. *Flowers* small, pink, with a smooth tubular calyx. *Fruit* the size of a pea.

PRUNUS, in *Gardening*, contains plants of the fruit-tree, flowering and evergreen shrubby kind, of which the species cultivated are, the common plum tree (*P. domestica*); the bullace plum tree (*P. insititia*); the apricock or apricot tree (*P. armeniaca*); the common or cultivated cherry tree (*P. cerasus*); the small-fruited cherry tree (*P. avium*); the common bird cherry tree (*P. padus*); the Cornish bird cherry tree (*P. rubra*); the common American bird cherry tree (*P. virginiana*); the Canadian bird cherry tree (*P. canadensis*); the perfumed cherry tree (*P. mahaleb*); the evergreen bird cherry tree (*P. caroliniana*); the common laurel (*P. lauro-cerasus*); and the Portugal laurel (*P. lusitanica*).

The varieties of the first sort, or garden and orchard plums, are very numerous, differing in the form, taste, colour, and substance of the fruit; but those mostly cultivated in this country are the following, according to Mr. Forsyth, and the times at which they ripen.

The jaunhative, or white primordian, which is a small plum, of a yellow colour, and mealy; it ripens in the latter end of July, or beginning of August: one tree of this sort will be sufficient for a garden of the common size. The early damask, which is commonly called the Morocco plum, and which is middle-sized, and the flesh good; it ripens about the beginning of August, or sometimes a little later. The little black damask, which is a rich fruit, a good bearer, and becomes ripe about the latter end of August, or there-

abouts. The great damask violet of Tours, which is a fine rich plum of a blueish colour, and becomes ripe in August. The red Orleans, which is large, of a rich juice, and becomes ripe in the latter end of August. The Fotheringham, which is an excellent plum, of a dark red, and the juice rich; there is hardly any plum that excels it, according to the opinion of some. The blue perdrigon, which is of a very good taste, and ripens in August. The white perdrigon, which is a pretty good fruit, and has a sweetish taste mixed with tartness; it ripens in the beginning of September. The red imperial, or red bonum magnum, which is a great bearer, and mostly used for baking; it is ripe about the latter end of September. The white imperial bonum magnum, or egg, white Holland, or Mogul, which is a large fruit, and, like the red, mostly used for baking; it is a great bearer, and ripens about the beginning of October. The la royale, which is a fine plum, equal to the green gage, but a shy bearer; it is of a red colour, and ripens in the latter end of September. The little queen Claudia, or Dauphiny, which is a small rich fruit, becoming ripe in September. The large queen Claudia, or Dauphiny, which is an excellent plum, of a yellowish-green, and ripens about the beginning of October. The green gage, which is of an exquisite taste, and eats like a sweetmeat; its colour and size sufficiently distinguish it from any other; it ripens in August and September; it has several sub-varieties, all of which are of good qualities. The drap d'or, which is a good plum, and a plentiful bearer; it is ripe about the latter end of September. The Chester, which is rich, and a great bearer; it is ripe about the latter end of September. The apricot, which is large and sweet, is ripe in the beginning of October. The maître Claud, which is a large round whitish plum; the juice is very brisk, though sweet; it is accounted among the best white plums that we have, and ripens about the beginning of October. The myrobalanus, or cherry plum, which is a middle-sized sweet fruit, and ripens about the beginning of September: this plum is frequently planted for ornament, as it blossoms early. The la Mirabelle, which is of an amber colour, and small, but full of juice, and excellent for sweetmeats; it bears well, and becomes ripe about the beginning of September. The Brignole, which is esteemed the best plum of any for sweetmeats; the flesh is dry, but of a rich flavour; it is ripe about the latter end of September. The red diaper, which is large, and of a very high flavour; it ripens about the beginning of September. The Saint Catharine, which is one of the best, and is much used for confectionary; it is also very good for the table, having a rich sweet juice; and is a good bearer, hanging the longest of any upon the tree. Mr. Forsyth says he has had them in gathering six weeks; it ripens about the latter end of September. The imperatrice, or empress, which has an agreeable flavour, and ripens about the middle of October; it is one of the latest plums, and should not be gathered till it begins to shrivel; it will then eat like a sweetmeat; and make a great addition to the table in the latter end of October and beginning of November. Monsieur's, or the Wentworth, which is a large fruit, resembling the bonum magnum; it ripens about the beginning of October, and is good for preserving, but too sharp to be eaten raw. The winefour, or Yorkshire, which is one of the best for preserving; it is ripe in October. The damson, of which a fine large sort from Shropshire, raised from suckers or stones, is an abundant bearer, of a rich flavour, and good for baking or preserving; it ripens in the latter end of September, and continues till near the latter end of October to be good and fit for use.

To these Mr. Forsyth adds the following list: the admirable,

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rable, the black damascene, the black pear, the blue matchless, the damas noir de Tours, the Don Carloses, the double-flowered, the early blue primordian, the early red primordian, the early amber, the early Tours or precoce de Tours, the early violet, the early Orleans, the fine early plum, the jacinthe or hyacinth, the Koa's imperial, the la prune Suisse, the la prune valeur Valentia, the matchless, the maugeron, the muscle, the Persian, the red queen mother, the royal pea, the royal dauphin, the St. Julian, the femina, the small white damascene, the Spanish damascene, the striped-leaved, the true prune, the verte-dock or verdock, the whitton or nutmeg, the white bullace, the white Orleans, the white pear, the white perdrigon.

The following sorts are recommended by the same writer as proper for a small garden; the jaunhative, the early damask, the Orleans, the la royale, the green gage in different sorts, the drap d'or, the Saint Catharine, and imperatrice; the magnum bonum for baking; and the winefour for preserving.

The second sort varies with black and white, or rather wax-coloured fruit; and also with a red, bitter, unpleasent fruit.

There are many varieties of the third sort; but the following are the most commonly cultivated, according to Mr. Forsyth: the masculine, which is a small roundish fruit; it is the earliest of all the apricots, ripening about the latter end of July; and is chiefly esteemed for its tart taste; when fully ripe, it is of a red colour towards the sun, and of a greenish-yellow on the other side. The orange, which is pretty large, but rather dry and insipid, and fitter for tarts than for the table; it is of a deep yellow colour when ripe, which is about the latter end of August; this is considered as the best for preserving. The Algiers, which is a flatted oval-shaped fruit, of a straw colour, juicy, and high-flavoured; it ripens about the middle of August. The Roman, which is larger than the Algiers, rounder, of a deep yellow, and not quite so juicy; it is ripe about the middle or latter end of August. The Turkey, which is larger, and of a deeper colour than the Roman; its shape more globular, and the flesh firmer and drier; it ripens about the latter end of August. The Breda, (brought from thence to England,) which is originally from Africa; it is large, round, and of a deep yellow colour; the flesh is soft and juicy; it is an excellent fruit, especially if ripened on a standard, becoming ripe about the latter end of August. The Brussels, which is held in very great esteem, on account of its bearing so well on standards, or large dwarfs; it is of a middling size, red towards the sun, with many dark spots; and of a greenish-yellow on the other side; it has a brisk flavour, is not liable to be mealy or doughy, and is preferred by many to the Breda; but when the Breda is planted as a standard, the fruit is more juicy and of a richer flavour; it ripens in August on a wall, but not before the latter end of September on standards. The Moor-park, called also Anson's, Temple's, and Dunmore's Breda, which is a fine fruit, and ripens about the latter end of August. The fruit of the peach kind, which was introduced from Paris, by his grace the duke of Northumberland, at Sion-house, in 1767, is the finest and largest of all apricots, and is generally thought to be the same as the Moor-park; but upon a minute examination, the leaves will be found to differ; it ripens in August. The black, which has been very lately introduced by sir Joseph Banks from France, in which country it is highly esteemed. It is observed, that the trees that sir Joseph planted in his gardens at Spring Grove, near Hounslow, bore fruit last season (1792) for the first time in this country; but, in consequence of the

wet and unfavourable weather, it did not arrive at perfection. It ripens about the second week in August. To the above, Mr. Forsyth has added the following; the great apricot, the Holland apricot, the Provence apricot, the alberge, the angoumoise, the blotch-leaved, the Nancy apricot, which has a fine large fruit; the Dutch apricot, the Grover's Breda, the Persian, the royal orange, the transparent, the Portugal apricot, which has a small fruit.

The following are advised as proper for small gardens, in order to have regular successions of fruit. The masculine, the Roman, the orange, the Breda, and the Moor-park.

Of the fourth sort the varieties are numerous; but the following are those most in cultivation, according to the above author; the small May cherry, which is the first ripe, and requires a good wall; one or two trees of this kind may be sufficient for a large garden; it is ripe in June. The May duke, which comes in about the same time as the former, but is larger; it is an excellent cherry, and bears well against a wall. The archduke, which, if permitted to ripen properly, is an excellent cherry; it becomes ripe in June and July. The Hertfordshire cherry, which is a sort of heart, but firmer and of a finer flavour than hearts in general; it does not ripen till the latter end of July or beginning of August, which renders it the more valuable, as it succeeds more early cherries. The bleeding heart, or Gascoign's, which is a very large cherry of a long form, and dark colour; it has a pleasant taste, and ripens in the latter end of July. The Harrison's heart, which is a fine cherry; it was introduced from the East Indies by governor Harrison, and first cultivated at his seat of Balls in Hertfordshire; some of the trees, Mr. Forsyth is informed, he presented to George I.; and they are at this time in a flourishing state, bearing fruit, in Kensington gardens; it is ripe in July and August. The black-heart, which is a fine cherry, but too well known to require any description. The Morello, or Milan, which is a very fine fruit when kept till the month of October, and makes a very great addition to the desert at that time of the year; it is the best cherry that we have for preserving, and for making cherry-brandy. The carnation, which takes its name from its colour, being red and white; it is a large round cherry, but not so sweet as the duke cherry; it ripens in the latter end of July. The yellow Spanish, which is of an oval shape and amber colour, and is a sweet pleasant fruit; it is ripe in August and September. The corone, or coron, which resembles the black-heart, and which is an excellent fruit, and a good bearer, ripening about the beginning of August. The lukeward, which comes in soon after the former, and is also a fine pleasant fruit, and a good bearer; it ripens in the beginning of August. The grassion, which is supposed by many to be the same with Harrison's heart; but, upon a close examination, Mr. Forsyth finds it to be a different cherry; its flesh is firmer and the stone flatter; it ripens in July and August. Ronalds's large black-heart, which was introduced into this country in the year 1794, from Circassia, is a fine large cherry, a great bearer, and valuable as a forcing sort; it is well worth cultivating, ripening in the beginning of July. The Frazer's black tartarian, which is a fine large fruit. The Frazer's white tartarian, which is white and transparent. These cherries are excellent bearers, but particularly the black kind; the fruit is of a fine brisk flavour, and they ripen early. The lundie gean, cultivated at lord viscount Duncan's, near Dundee, which is black, and almost as large as a black-heart cherry; Mr. Forsyth says, it is now common in the nurseries about Edinburgh; and that Messrs. Gray and Wear have had it for some years in their nursery at Brompton park. The transparent gean, which is a small
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delicious fruit. To these the following list is subjoined; the amber heart; the black mazard; the Churchill's heart; the double-blossomed; the Flemish heart; the gros goblet; the Holman's duke; the Jeffrey's royal; the Kensington duke; the large Spanish cherry; the late large Morello; the Montmorency; the ox heart, the purple heart; the red heart; the Swedish black heart; the South's large black; the Spanish black; the Tradescant's; the Turkey heart; the weeping; the Wentworth heart; the white heart.

And the following are recommended as proper for a small garden. The May duke; the large duke cherry; the arch-duke cherry; the black heart; the Harrison's heart; the ox heart; the Turkey heart; and the Kensington duke cherry.

The only varieties raised by seeds from the fifth sort, are the black coroun, and the small wild cherry; of which there are two or three subvarieties, differing in the size and colour of the fruit. It is observed by the editor of Miller's Dictionary, that the wild cherries are proper to plant in parks, because they grow to a large size and make beautiful trees. In spring, when they are in flower, they are very ornamental; the fruit is good food for birds; and the wood is very useful for turners. These trees thrive in poor land better than most other sorts. The French often plant them for avenues to their houses, on poor land; they also cultivate them in their woods, to cut for hoops; and the stones are generally sown for raising stocks, to graft or bud other cherries upon, being of quicker growth and of longer duration. It is added, that the garden cherry grows only about fifteen or twenty feet high, whereas this attains forty or fifty feet in height, with a more erect and lofty head.

The sixth sort is commonly propagated in the nurseries as an ornamental tree or shrub, growing well in woods, groves, or fields, but not in a moist soil. It bears lopping, and suffers the grass to grow under it. It is sometimes called the cluster cherry tree.

Method of Culture in the Plum Kind.—It is obvious that all the varieties were first obtained by seed, or the stones of the fruit; and the approved kinds acquired in this manner were afterwards multiplied by grafting and budding, as they do not continue the same sorts from seed; for from the seed of one tree many different sorts may be produced, and probably none like the mother-tree, and very few that afford fruit worth eating: but when in possession of any approved sorts, they may be multiplied at pleasure, by ingrafting shoots or buds of them into any kind of plum-stocks. Of course the mode of increasing these trees is by grafting, budding, and occasionally by layers; but the two former are the most usual methods of practice.

The two first modes may be performed upon stocks of any sorts of the plum kind, which have been raised from the stones, sown in autumn in beds of good earth, about two inches deep; and when the plants are a year old, planted out in nursery rows two feet and a half asunder; when, after having from one to two or three years' growth, they are in a fit state for grafting or budding with the desired sorts; which is performed in the usual way, either low in the stock for dwarfs, or at several feet height for standards. See GRAFTING and INOCULATION.

These trees may be trained either as dwarf wall-trees, espaliers, or as standards and half standards.

When the first shoots from the graft or bud are one year old, those of the trees designed as dwarfs for walls, &c. should be headed down within five or six inches of the bottom, particularly the budded trees, in order to force out laterals from the lower eyes, so as to furnish a proper set of branches, proceeding regularly from the bottom of the tree,

to cover every part of the wall or espalier. With regard to the standards, their first shoots may either be suffered to run and branch in their own way, or headed to a few eyes, if it seem necessary, to force out lower laterals to give the head a more regular spreading form, afterwards letting them all take their own natural growth.

When the trees raised in either of these modes are from one to two or three years old, they are of a proper size for being finally planted out in the garden, or other proper place; though trees which are much older may be safely removed; but the younger they are planted where they are to remain, the sooner and more firmly they establish themselves, and form for bearing.

In the layer method, which is only practised occasionally, the business may be performed any time from November till March, choosing the last summer's shoots, and laying them down by *slit-laying*; when in one year they will be rooted, and must then be separated, and planted in nursery rows, being trained either for dwarf, or standards, as may be required.

And the double blossom, the striped varieties, and the stoneless kind, are all increased by budding or grafting upon any kinds of plum-stocks, either for dwarfs, or half or full standards.

The bullace kinds are capable of being increased by sowing the berries or stones an inch deep in a bed of common earth in autumn; but to continue the different varieties distinct, they must be increased by budding, grafting, or laying, as in the other sorts.

The proper season for planting all the sorts of these trees is any time, in open weather, from November until March. And trees of all the varieties will mostly succeed in any common soil, and open exposure; but some of the best sorts should always be put for walls and espaliers, those for walls generally having an east or west aspect, or even a south wall for some of the choicest sorts, and a few may also be planted against a north wall, to furnish late fruit: and those for espaliers may be planted round any of the open quarters, as also the standards.

The trees designed for walls and espaliers should be planted out at fifteen or eighteen feet distance; though where the walls, &c. are rather low, eighteen or twenty feet distance may be requisite, in order that, in default of a proper height of walling, there may be more scope to train the branches horizontally. But when the trees thus planted are quite young, as only of one year's shoot from the grafting or budding, they should in March be headed down, as above, to four or five eyes, to force out lower horizontals in the ensuing summer; which, according as they advance in length, should be trained horizontally at full length all summer, unless it be necessary to forward a further supply of lower branches as fast as possible; in which case the young shoots should be pinched off in May down to a few eyes, when each will throw out several lateral branches the same year, which should also be trained horizontally at full length during their summer's growth; and in the winter pruning, cutting out only any fore-right and back shoots, training in all the regular ones at full length; as the branches of these trees should be shortened only occasionally to procure wood to fill vacancies, as the branches always form fruit-spurs first towards their extreme parts, which would be destroyed by shortening: so that, after having shortened the first and second year's shoots occasionally, as above, and thereby procured a proper set of lower horizontals, to give the head its first form; the whole may then be trained in entire about four, five, or six inches asunder; and accordingly as the trees shoot, every summer training in a necessary supply of the regular shoots to fill the

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the wall, &c. at the same time retrenching superfluities, and irregular and very rank luxuriant growths, training the supply of regular wood still at full length at the above distances; by which the trees will soon cover a large space, and the same unshortened branches continue bearing many years. See PRUNING.

The necessity of this sort of training is obvious from all the forts bearing principally upon spurs, half an inch or an inch long, arising from the sides of the branches, of from one or two to many years old, which, if shortened, would throw out a multiplicity of useless wood, and hardly any fruit-spurs.

All the forts of wall and espalier trees of this sort should be pruned twice every year, as in summer and winter, in order to retrench the superfluities of each year, and all fore-right and other irregular shoots, and bad wood, and to train in a necessary portion of young wood where wanted to fill vacancies, or to supply the place of decayed, worn-out, and other bad branches.

The standard trees should be trained as full standards and half standards, budding or grafting the former six feet high, and the latter only three or four; both kinds being worked low in the stock, training the first shoots to those heights for stems, then suffering them to branch and form heads: these may be planted out at from twenty to thirty feet distance, letting heads form naturally.

Mr. Forfyth advises, that in choosing the trees the same directions should be observed as for apricots. Clean straight plants, with single stems, should be employed, as those with two never make handsome trees on walls or standards, and the border should be managed as directed for apricots; digging the holes the same width and depth, and loosening the bottom: then fill up the holes with fine fresh loam, or the mould that was used the preceding year for melon and cucumber beds; being careful to keep the mould a proper height above the border, and the roots of the trees as near the surface as possible, spreading them horizontally. When there are any tap-roots, they should always, he says, be cut off, as should also the fine hairy roots, as they are liable to get mouldy and rot, and thereby bring on a putrefaction of the mould about the root of the tree. When the roots are not spread near the surface of the ground, it will, he says, prevent the sun and air from penetrating to them; and the fruit, of course, will not have so fine a flavour. He further advises that the stems of young plum-trees should never be cut when first planted, but be left till the buds begin to break, when they may be headed down to five or more eyes, always observing to leave an odd one for the leading shoot; always cutting sloping towards the wall, and as near to an eye as possible. Thus managed, the shoots will soon fill the wall with fine wood. When it is found that some of the shoots are too luxuriant, they may have the tops pinched off with the finger and thumb, as above, about the beginning of June in the first year after planting; by doing which plenty of wood may be obtained to fill the bottom of the wall. He adds, that a great deal depends on the first and second year's management of the trees.

With respect to the distance from each other at which plum-trees should be planted against a wall, it depends on the height of the wall. If the wall be ten feet high, which is the common height, they may be planted at eight yards distance from tree to tree; but if the wall be twelve feet high, or more, seven yards will be sufficient. For his part, he prefers a wall of ten or twelve feet, which will, he thinks, be found high enough, if the branches are trained horizontally; by which means the tree will be much more fruitful, and not grow so lux-

uriantly. He further adds, that by training an upright shoot on the plums, as directed for pears, fine kind shoots may be gotten from the sides. The leading shoot should be shortened, leaving it from one to two feet long, according to its strength. If the leading shoot be very strong, it may, he thinks, be topped twice in the summer, as for pears, and at the same time repeating the same every year till the wall is filled to the top. He would always recommend, where it is convenient, to allot one wall for plums and another for cherries, as they always thrive best by themselves, or when distinct.

As there will be plum-trees to spare, that were planted between pear-trees, when they begin to meet, these should be planted against another wall, or as dwarf standards. Those intended for standards should be prepared in the following manner. The year before they are to be planted they should be cut in the side-shoots at different lengths from one foot to three, according to the size of the trees; suffering them to grow rude all the summer, neither nailing in nor cutting the sides and fore-right shoots. And some time during the winter the ground round their roots should be opened, cutting in the strong ones, which will cause them to put forth fine young fibres; then filling in the earth. In the following autumn, or during the winter, the sooner the better, they should be transplanted out as standards. And in transplanting of the trees, especially large ones, he considers it to be of great consequence that they be placed in the same position (that is, having the same parts facing the same points of the compass) as formerly. If notice be taken when a tree is cut down, it will, he says, be found that three parts in four of the growth are on the north side. When it is intended to plant them against a wall, they should never be cut in the side shoots, but only the roots; by this method the trees will, he says, bear fruit the first year after transplanting, and there will be a great saving of time and money. He has often transplanted old plum-trees that have been headed down that have made very fine roots, which he has divided, and thereby obtained four or five trees from one, cutting them so as to form them into heads. "Some that were transplanted in 1798 were in full blossom in 1799, producing some fruit, and in 1800 bearing a full crop."

It is recommended further by the same author, that "the ground in the borders and quarters where fresh trees are to be planted should be well trenched, two spits deep at least, to give the roots room to run into the fresh-stirred ground." And he says, that when the trees are planted without stirring the mould they seldom thrive well.

He advises, that "when plum-trees are planted for standards in an orchard which is to be kept for grafts, they should be in rows at the distance of twenty yards from each other. If in the kitchen garden for standards, he would always recommend the planting of dwarfs." The tree may be trained up to have a stem of about three feet high, at the distance of seventeen yards. If the garden is laid out with cross-walks, or foot-paths, about three feet wide, the borders should be made six feet broad, planting the trees in the middle of them. "In the royal gardens at Kensington, which are very long and narrow, and where the winds are very hurtful, he has," he says, "planted two rows of apple-trees, intermixed with other fruit-trees, alternately, one row on each side of the middle walk (which runs the whole length of the garden), at the distance of seventeen yards from each other. He has also made cross-walks of three feet broad at the distance of seventy yards, with borders on each side six feet wide, having two rows of trees in each border, about twelve or fourteen feet asunder.

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These dwarf-trees are very useful in breaking the force of high winds, and are at the same time of such a height, that a man standing on the ground may gather the fruit. As plum-trees may be planted in the same manner and for the same purpose as the above, he can have the quarters clear for crops for the kitchen, and a free air be admitted, which can never be had where espaliers are planted. Dwarf standards can," he says, "be kept to what size you please; they look much handsomer than espaliers, and produce a greater quantity of fruit."

In regard to the method of managing and restoring old decayed trees of this sort, he remarks, that he has restored "some of them which were so far decayed as to have only from one to two or three inches of bark left; they are now completely filled up with sound wood, with large heads, which at four years' growth filled a wall sixteen feet high, and are at this time full of fine fruit; some of the stems are several inches in circumference, bearing treble the crops produced by young trees that have been planted three times as long as they have been headed down. Where the trunks are become hollow, he always cuts out all the loose rotten parts, and also examines the roots, cutting off what is rotten, injured, or decayed. This method should," he says, "be pursued with all hollow and decayed trees; and, if properly executed, they may be so completely filled up, as scarcely to leave a mark behind, even where the wood is totally decayed. He has had shoots from trees of this sort which have been headed, that have grown upwards of seven feet long, and as large as a walking-stick, in one summer: this should never be suffered; but they should be pinched off with the finger and thumb, in the beginning of June, close to an eye or a bud, unless the wall be filled to the top; in which case they should never be cut while they continue to bear handsome fruit. Before they begin to cease from bearing, you must always," he says, "begin with shortening every other shoot, leaving them only from six inches to a foot long, and nail them in till the second year, taking care to rub off the superfluous and strong fore-right shoots: by that time they will begin to bear: then cut out the others that have done bearing: by this method you will," he thinks, "keep the trees in a flourishing state. When the branches are thus managed, they will frequently throw out small dugs, or fore-right shoots, about an inch or two long, which will flower next year. They should never be shortened till after the fruit is set, and become about the size of a large pea; by that time the leaves will have covered the fruit, and be able to protect it from the inclemency of the weather. You may now shorten these shoots close to the fruit, which will leave them from one to two inches long. This method he has practised with great success for several years. By leaving these short fore-right shoots, the fruit is," he says, "protected till it is out of danger of being killed by the frost, or stunted by the cold north and north-west winds that happen about the latter end of March and the beginning of April. The cold chilling rain and snow, which are also very injurious to the fruit, will be thrown off by the branches standing out from the trees. He by no means likes to see great spurs standing out from the wall; for they are always sure to be injured by the frost and cold winds. When the shoots are left naked, he has often seen the plums turn yellow, and drop after they have grown to a considerable size, from their being exposed to the cold frosty winds and rain. They should, therefore," he thinks, "in cold and frosty weather, be covered in the same manner as apricots. Plums are," he remarks, "more tender than any other sort of stone-fruit, owing to the flower-cup dropping sooner than that of

peaches, nectarines, &c. And they are very liable to decay after cutting off large limbs or branches, which always brings on the gum and canker, if it be left to nature to perform the cure. He would, therefore, recommend the application of the composition (in the same manner as directed for other sorts of fruit-trees,) to every shoot where the knife touches; as soon as the trees are cut and nailed." And with the intention of having the fruit large and fine, care must be taken to thin it where too thick; but that must not be done too soon, lest it should be pinched by the cold. The fruit ought to be of the size of a small marble, and well sheltered by the leaves, before any attempt is made to do this. He advises never to pull off the leaves that shelter the fruit, till it is full-grown and begins to turn. See AMYGDALUS.

In conclusion it is also observed, that "he has taken up several old trees from the walls, when they have grown too near each other, and planted them out as standards, at the same time shortening their branches to form handsome heads, which are now full of fine fruit." These hints and directions are highly deserving of attention, as being the result of much practical experience.

Method of Culture in the Apricot Kind.—These trees are increased by budding them upon any kind of plum-stocks, for which purpose they are raised from the stones of the fruit, sown in autumn in beds of light earth two inches deep; when they will come up the following spring, and in autumn or spring after be fit to plant out in nursery-rows; when in a year or two they will be fit to bud for dwarfs for walls, &c.; but for half standards and full standards they must have three, four, or five years' growth, and be trained up with stems from three or four to six feet high; though sometimes the budding for standards is performed low in the stock, and the first shoot trained up for a stem.

The operation of budding should be performed in August, being careful to procure shoots from which to take the buds from trees of the best sorts, performing the operation in the usual way. See INOCULATION.

The buds shoot in the following spring; at which time, before they begin to push, the stock should be headed down a little above the insertion of the bud; soon after which the buds will shoot and advance rapidly, and by autumn form a large shoot, and the trees are then proper for planting out for good, especially the dwarfs intended for wall-trees; or some may remain a year or two longer in the nursery, and be trained in a proper manner for planting against walls; and others for standards. But whether they remain in the nursery, or are planted out into the borders, the first shoot from the bud should, in the March following, be headed down to four or five eyes, to procure lower horizontal branches, as in the plum.

When those intended for wall-trees are of one year's growth with their first shoots or head entire, they are of a proper size for planting out finally where they are to remain. They may be planted out any time in open weather, from October until the beginning of March, choosing a south wall for the early and some other kinds, to come in forward; but as those exposed to the full south sun are apt to become soon mealy, it is proper to plant a principal supply against east and west walls.

Mr. Forfyth, however, thinks "the best time for planting apricots is in autumn, as soon as the leaf begins to fall. The person who goes to the nursery for the plants should," he says, "make choice of those which have the strongest and cleanest stems; and if he can procure such as have been headed down, (to use the phrase of the nurserymen,) of two

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or three years' growth, they will bear and fill the walls much sooner than those which have not been so treated. He should make choice of trees with one stem; or, if they have two, one of them should be cut off; for by planting those with two stems the middle of the tree is left naked, and of course one-third of the wall remains uncovered." And though it is a practice with many to make choice of those with the smallest stems, he thinks they always make weaker shoots than the others.

These trees succeed in any common soil; they are usually planted in a range close along the wall, at eighteen feet distance, with their heads entire, which should be fastened either to the wall or to stout stakes, one to each tree, to preserve them steady until spring, when they must have their first pruning, &c.

Mr. Forfyth, however, directs, that "if the borders wherein the trees are to be planted be new, they should be made two feet and a half or three feet deep, of good light fresh loam;" and that, "if the trees are to be planted in old borders, where the earth has been injured by the roots of the former trees, it will be necessary to take out the old mould at least three feet deep, and four feet wide, filling up the hole with fresh loam, taking care to plant the trees about eight inches higher than the level of the old border, to allow for the sinking of the earth, that they may not be too deep in the ground."

After being planted, if the trees are only one year old with their first head from the bud entire, they should be headed down in the spring to four or five eyes, to force out branches below; after which the trees should have water in dry weather, and the shoots from all the remaining eyes should in summer be nailed up regularly to the wall at their full length; and if any fore-right or back shoots come out, they should be rubbed off, being careful to continue the regular shoots to the wall all summer and the following winter; and in spring each shoot should be shortened to about eight, ten, or twelve inches, according to their strength, leaving the lower ones on each side rather the longest; this pruning short being still necessary, in order to procure a further supply of lower branches, that every part of the wall may be occupied quite from the bottom; having particular attention to preserve nearly an equal number of branches arranging on each side of the tree, nailing them close to the wall horizontally, four, five, or six inches asunder. In the summer following, each horizontal branch will push out three or four, or more, new shoots, of which, if any rise fore-right and behind the branches, they should be rubbed off early in the season, nailing in all the regular side-shoots at full length during the summer, except it is necessary to pinch any particular shoot early to fill a vacancy. In the winter pruning, if there be any superfluities, or irregular growths left in summer, they should be cut out close, and all the regular-placed necessary shoots be shortened, though they should not now be pruned so short as in the two first years, only cutting each shoot according to its strength, from about eight or ten to fifteen or eighteen inches long: as the head of the tree is now tolerably well-formed, therefore pruning only so as to obtain a further supply of wood, and a production of fruit; for as these trees bear principally upon the year-old wood, it is proper to train in a general supply of young shoots, of each year, in every part; the same shoots producing at the same time both a crop of fruit and a supply of wood for next year's bearing. The annual supply of wood must always, however, be shortened in the winter pruning; for if left entire it would produce only some shoots near to the top, and leave the

bottom naked, so as in a few years the whole tree would become very thin of bearing-wood below, and bear only a little towards the extreme part of the branches. And as these trees bear also upon short spurs, arising upon the two years-old branches, it is proper to preserve them wherever they appear, only retrenching such as project considerably fore-right; leaving all those of one or two inches long, as the young shoots of one year's growth are the principal bearers: those produced one year bear fruit the next, and a general supply must be every year retained, and not shortened in summer, which would force out laterals from every eye, and spoil the shoots for next year's bearing; but in the winter pruning, a general shortening is necessary, according to the strength of the tree, and the situation and strength of the respective shoots, and the whole tree should then be regularly nailed to the wall.

Mr. Forfyth says, that "when the trees are planted, they should by no means be headed down till the month of April or May, when they begin to throw out fresh shoots: strong trees should be cut a foot from the ground; and those that are weak, about half that length. But in backward seasons, they should not be headed down so early; never until the buds are fairly broken: always observing to cut sloping towards the wall, and as near to an eye as possible, that the young leading shoots may cover the cut; which operation should be again performed in the next March or April: the shoots that are then thrown out must be trained horizontally, to cover the wall; the number of these to be left ought to be from three to six on each side, according to the strength of the main shoot; taking care to rub off with the finger and thumb the fore-right shoots all over the tree, except a few which may be wanted to fill up the wall, near the body of it: and in the second year the horizontal shoots must be shortened in the same manner, according to their growth; and so on every year, till the wall shall be completely covered from top to bottom."

He adds, that "it is a frequent practice with some gardeners, to head down the trees at the time of planting; which often proves fatal to them."

These trees must be pruned twice a-year, as in summer and winter.

In the summer pruning, the irregularity of the numerous shoots should be reformed, beginning in May or early in June, and rubbing or cutting off close all fore-right and back shoots, and all superfluities or very rude growths; retaining, however, in every part a full supply of the regular side-shoots, as succession-wood for the next year's bearing, training them in at full length, as above, to remain till the winter pruning; as it is of importance to leave more than a sufficiency of the well-placed shoots at this season, to have plenty in every part to choose from in the general winter pruning. See PRUNING.

In the winter pruning a general reform should be made in all the branches and shoots, retrenching all worn-out and old naked branches ill-furnished with bearing-wood; at the same time selecting and retaining, in every part, the best shoots for the next summer's bearing, cutting out close all the superfluous or unnecessary and ill-placed shoots, and reducing part of the former year's bearers and unfruitful old branches in every part of the tree, to make due room to train the necessary supply of young wood at proper distances; being careful in retrenching the old wood occasionally, to prune it down either to a young shoot, or to some convenient branch it supports, which is furnished with one or more such shoots, so as every branch may also terminate in a young shoot for its leader, cutting off all small shoots arising from the sides of the main ones, and letting the general supply

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supply of young wood in every part be now shortened moderately, according to their strength: the smaller shoots may be cut to about eight or ten inches, the middling ones to twelve or fifteen, and the strong shoots to eighteen inches or two feet long, pruning them generally to a wood-bud, in order to obtain a shoot at the end for a leader. All dead wood, cankered parts, decayed spurs, and stumps should be cut out; and as soon as one tree is pruned, let it be directly nailed, which should be performed with great regularity, training all the branches, &c. horizontally, as straight and close to the wall as possible, at equal distances. See PRUNING.

When these trees are of a strong vigorous growth, the shoots should be left thicker or more abundant than in moderate shooting trees, shortening them less in proportion, that by dividing the sap among many and a greater extent of branches, the luxuriance may be restrained, as the more the strong young wood in a luxuriant tree is pruned, or the shoots shortened, the more vigorous the tree shoots, and produces little fruit. See AMYGDALUS.

The old trees should be well attended to in pruning, to continue them in a good fruitful state, by encouraging young wood in proper abundance; as by this care the trees not only more certainly produce crops, but the fruit generally ripens earlier, and has a peculiar richer vinous flavour. As these old trees are apt to run up naked below in the main branches, care should be taken, when young wood advances in these parts, as well as in all vacant spaces, to preserve it so as to continue all the parts of the tree, from bottom upwards, regularly furnished with bearing wood.

In respect to old decayed trees, Mr. Forsyth says, "it has been the general practice to train wall-trees in the form of a fan, which occasions the sap to rise too freely to the top, leaving the lower part almost naked; so that scarcely one quarter of the wall is covered with bearing wood." He says, that, "in that case, it will be necessary to cut down the whole of the tree as near to the place where it was budded as possible, always cutting it at an eye or a joint: if there should be any young shoots on the lower part of the tree, it will be proper to leave them, training them horizontally, which will check the flow of the sap, and thereby render them much more fruitful." He adds, that, "very frequently, when large branches have been cut off in a careless manner, and the wounds left to nature, the whole tree is infected with the gum and canker; which, if not checked, will in a short time totally ruin it: the best remedy in this case is," he thinks, "carefully to pare off the cankered part of the bark with a draw-knife, or other convenient instrument. You will frequently find the white inner bark infected, which must also be cut away, till no appearance of infection remains; this may be easily known by the brown or black spots, like dots made with a pen, of which not one must be suffered to remain: all the branches so cut and pared should," he says, "be immediately covered with the composition in a liquid state." And "as we sometimes see walls with all the trees infected, it will in that case be most prudent to cut every other tree, leaving the rest for a supply of fruit till those which are cut begin to bear; this will be in the second or third year. When trees are in a very bad condition, they should," he thinks, "be cut in a partial manner, taking off the worst branches first, particularly those in the middle of the tree, always cutting as near to the graft as possible; or every other branch may at first be taken out, leaving the rest to bear; by which means there will be a supply of fruit, while the other parts of the tree are renovating: it should be remembered, however, that all the cankered bark must

be cut off without loss of time; otherwise the new wood will be infected. Old trees thus headed down will," he says, "sometimes throw out very strong and vigorous shoots, which it may be necessary to top, as it will cause them to throw out side shoots, and soon fill up the wall with fine bearing wood; but they should never be suffered to have any fore-right spurs, except little dugs: the topping should be done in the beginning of June, which will cause the tree to produce fine bearing wood for the next year: those trees must be pruned in March following, shortening the shoots from fifteen to six inches, but according to their strength, always leaving the strongest shoots longest. And wherever the knife has been used, the composition must," he says, "be immediately applied."

It is also observed, that "after the fall of the leaf, it will be proper to unnailed the young shoots, leaving only a few to prevent the tree from being broken by the wind. By this method they will be more exposed to the sun and air, which will ripen and harden the wood much more speedily than if they be left nailed." He adds, that "he has a great dislike to autumnal pruning of fruit-trees, of all kinds of stone-fruit in particular; for by pruning at that season you seldom fail to bring on the canker: and no fruit-trees are more liable to this disease than the apricot: the reason is obvious,—the great acidity in these trees, the exposure of the wounds, and the dormant state of the sap, predispose to mortification; whereas, in spring, when the sap is beginning to flow, and will follow the knife, the lips will quickly grow: if the branches are small, a fresh bark and fresh wood will in one season completely cover the wound; but if large, a time proportionate to their size will be occupied: this process, however, is manifestly much accelerated by the application of the composition, which excludes the air and wet from the air and sap-vessels of the tree."

In regard to the standard trees, they sometimes in favourable seasons bear plentifully, particularly the Breda and Brussels apricot, either in half or full standards; the half standards are more out of the power of the winds and cold air.

These should be planted in a sheltered warm situation in the full sun, that they may have a greater chance of setting a good crop of fruit, and of ripening more effectually with a rich flavour: their culture is nearly the same as that of other standard fruit-trees: they require but little pruning, only just to reduce or retrench any very irregular growth or out-growing rambler, or occasionally to regulate confused crowding branches, and to cut out decayed wood; all which should be performed generally in winter.

Covering and protecting the Blossoms and young Fruit.—As trees of this kind planted against walls blossom very early, both blossom and young fruit are very liable to be injured by frosts and cutting blasts; it is therefore useful to afford occasional protection, in unfavourable seasons, to some of the forwardest and most valuable kinds, either with mats suspended over the trees, or twigs of evergreens stuck between the branches, beginning the covering as soon as the blossom begins to expand, and continuing it till the fruit is fairly set; the mats to be used only on nights and in bad weather, but the evergreens to remain constantly till all danger is past.

Mr. Forsyth remarks, that "in severe weather they ought to be covered before the flowers begin to expand; for he has often seen the blossoms drop off before they opened; and he asserts, that the best covering is old fish-nets, which should be put on three-fold; and if a few branches of dry fern are stuck in among the branches before

fore the nets are put on, they will assist greatly in breaking the force of the high winds." The common practice of covering with mats in the night, and taking them off in the day, by frequently exposing the trees to the cutting winds, does, he thinks, more harm than good. And the covering with branches of spruce-fir and yew, by being too close, he supposes, encourages a blight, and causes the leaves of the trees to curl, and the shoots to break very weak; whereas the nets admit a free circulation of the air, and at the same time break the force of the wind: when it happens to rain or snow in the fore part of the night, and freeze towards the morning, the drops are, he says, found hanging in icicles on the meshes, while the tree is almost dry; when the shoots become pretty long, and the leaves expand to cover the fruit, it will be necessary, he says, to keep the net clear from the tree, by placing forked sticks, from six inches to a foot long, between it and the wall: this will prevent the shoots and leaves from growing through the net; the forked end of the sticks should rest against the meshes of the net. See *AMYGDALUS*.

Thinning out the Fruit.—In some seasons these trees set many more fruit than can attain perfection; and as they sometimes are placed very close, or often in clusters, and sit close to the branches without any yielding footstalks, as in cherries, &c. they, in their advancing growth, must impoverish and thrust one another off; thinning becomes necessary, which in wall-trees particularly should not be omitted, and it is also proper occasionally in standards in some degree. This business should be begun when about the size of large cherries, &c. and should be done with great regularity, leaving the largest, fairest, and best situated to grow to maturity, mostly all singly, or at least never more than two at the same eye, but most commonly single in the large kinds. The fruit thinned off makes excellent tarts, and should always be saved for that purpose, and for which use they may be thinned by degrees, both in wall-trees and standards; but not in the former, so as to leave the superabundant fruit to grow large in any considerable degree, nor in great quantity, to rob the continuing crop of its proper nourishment; for this use they should always be gathered before they stone, or harden in the heart or middle.

Method of Forcing Apricots.—In this method the fruit is obtained much more early than in the natural way, and is effected by having the trees in hot-houses, or on hot-walls, or in bark hot-beds.

The proper trees for this purpose are the dwarfs, trained as wall or espalier trees, but sometimes as small low standards: they are mostly trained in the full ground till advanced to some degree of bearing, and then planted in the borders of the forcing-house and hot-wall, and trained in the manner of wall-trees, to a light open trellis; some also, as small dwarf standards, placed forward in the former, or occasionally in pots, and introduced in the same situation; in all of which, the trees, being well fresh-rooted in their places, are forced at the proper season by means either of fire-heat, or bark-bed, or sometimes both occasionally in forcing-houses, but in hot-walls mostly by the former; the forcing-houses and hot-walls have mostly flues for fire-heat, and sometimes the former have a pit for a bark-bed; but where this is not the case, the whole bottom space is formed of good earth, and the trees planted in are generally in assemblage with peaches, nectarines, plums, &c. as the same degree of heat is suitable to the whole.

The proper season to begin the work of forcing is principally in January, or early in the following month; when, or rather a little time before, the glasses are shut close; and at the proper time the fires made in the furnace moderately

every evening and morning, to heat the flues in a proper degree, to afford a moderate regular heat, to warm the internal air to a proper degree, which forwards the trees to early blossoming and fruiting; having fresh air moderately admitted in fine days, and more freely when there is a warm sun; being sometimes watered both in the earth and over the branches after the blossom is passed, and the fruit fairly set. See *FORCING-FRAME*, &c.

Culture in the Cherry Kind.—These are all increased by grafting, and budding them upon stocks of any of the cherry kind, raised from the stones of the fruit of any of the sorts; but for having larger-growing trees, for standards, walls, and espaliers, the most general stocks used are the wild black and red cherry, raised from the stones of the fruit; they, however, grow upon any sort of these stocks, and likewise take upon plums, though these stocks are not proper for general use; they are also capable of growing upon laurel-stocks; which, however, is only practised for curiosity, suffering a small part of the stock to grow up to shew the singularity of the two sorts growing upon the same root. All the varieties likewise take upon the bird-cherry stocks; but this should only be practised when it is required to dwarf any of them as much as possible; which, in this way, are proper to train for small dwarf trees, either to plant in pots, or in the open borders, and in pots for forcing, or to plant in the borders of a forcing-frame. See *FORCING-FRAME*.

But for general use, stocks either of any of the common cherry varieties; or, to have larger trees, the wild cherry-stocks, should be used, as being the freest shooters and of longest duration; though, in raising the stocks, it is from the stones of the fruit, which should be sown in autumn in beds of light earth, covering them near two inches deep; they come up in the spring, and in the autumn or spring following, if the plants are strong, plant them out in nursery rows two feet and a half asunder, to remain for grafting, &c. which, when about the size of a large goose-quill to that of a person's little finger, or little more, they are fit to work for dwarf trees; but for standards, they must have at least four years' growth, as they must be grafted at five or six feet height. And to have trees of more moderate growth either for walls, small standards, or dwarfs, the Morello and small May cherry stocks may be proper.

The grafting and budding of all the sorts is performed in the usual way, though the former is most proper for general practice, as they are not so liable to gum in the grafted part as in that of the budded trees. Though both methods may be occasionally used, and may be practised as the stocks occur in proper growth, &c. whip-grafting is the most proper, for the most part, in this method of raising them; the budding is performed in the common way; the grafting should be done in the spring, as February and March, and the budding in summer, as June or July; the dwarfs should be grafted or budded near the ground, and the half and full standards from three to six feet high; the grafted trees shoot the same year, and the budded ones the spring following.

When the first shoots from the graft or bud are a year old, those of the dwarf sorts for walls, &c. must be shortened down in March or beginning of April, to five, six, or eight inches long, according to their strength; to procure lateral shoots to form the head, and the standards may be shortened or left entire as the case requires. When wanted to form a spreading head, the first shoots should be shortened to force out lower branches; after this, the branches of the dwarfs and standards remain mostly at their full length; and while the trees continue in the nursery, those designed for walls, &c. should be trained to stakes, in a proper position, occa-

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sionally pinching or pruning young shoots of the year early in summer, down to a few eyes or buds where necessary, in order to procure a production of lateral branches the same season, to train in for a further supply of young wood, to increase the expansion of the branches as soon as possible to continue entire.

When the trees have from one or two to five or six years' growth they are proper for being finally planted out; though, if planted when their heads are not more than two or three years old, they succeed much better than larger trees. Mr. Forsyth advises the same attention in choosing these trees, as for apricots, peaches, and nectarines, and that they should be headed down the first year.

The season for planting them out is any time in open weather, from the end of October or beginning of November till March.

The wall and espalier trees should be planted eighteen or twenty feet distant; and where the walls are tolerably high, a half, or a full standard may be planted in the spaces between the dwarfs, that while these cover the bottom and middle, the standards may cover the upper part of the wall.

When those planted against walls or espaliers were planted when only one year old from the grafting, &c. with the first shoot from the graft or bud entire, they should be pruned short in March or beginning of April, to furnish lateral branches; but if they were headed in the nursery, and horizontal branches obtained, they must not be shortened afterwards, except occasionally in particular shoots to fill a vacancy; as the fruit-spurs first rise towards the upper end of the branches, a general shortening would not only cut away the fruitful parts, but force out a great deal of useless wood. The necessary branches, arising every year after the first heading down, should be trained horizontally at full length, five or six inches asunder; and where wood is wanted some adjacent young shoot may be pinched in May or early in June, or shortened in the spring following, when it will push forth two or three laterals; being careful to retrench all fore-right and other irregular-placed shoots, and continue training the regular branches still at full length at equal distances, till they have filled the proper space of walling or espalier.

In these trees the bearing-wood does not want renewing annually, the same branches continuing bearing several years, and only want renewing with young wood occasionally, as any branch becomes barren or an ill bearer, except in the Morello, which generally bears the most abundantly in the year-old young wood; a general successional supply of each year's shoots should therefore be retained for successional bearers.

The trees in all the sorts should be pruned twice every year; a summer pruning being given early in the season, to retrench all the superfluous shoots soon after they are produced, likewise all fore-right and other ill-placed shoots, and rank wood, as soon as possible; and to pinch shoots where wood is wanted, so as there may be as little pruning as possible upon the older wood, which is apt to gum by much cutting; retaining, however, a general moderate supply of the regular placed shoots to choose from in the winter pruning, training the whole at full length; and in the winter pruning, examining the general branches, old and young, both in the former trained bearers, and the retained shoots of the preceding summer, retaining all the fruitful and regular placed former trained branches; and if, among these, any irregularity, disorderly or improper growths occur, the whole should be reformed by proper occasional pruning. In old trees, as well as others, it is proper to retrench any worn-out or declined naked branches, which are destitute of bear-

ing-wood, or fruitful spurs, and to cut out all decayed wood; retaining a plentiful succession of last summer's young wood, in proper places, where necessary, to supply the place of any unserviceable old wood now retrenched; and at the same time cutting out all superfluous, or over-abundant, and other unnecessary shoots reserved last summer, not now wanted, leaving only some well-placed ones, in any vacant spaces, or some in particular parts, to train in between the main branches, to be advancing for bearers, ready to supply any deficiency; and generally a terminal shoot to the general branches in all parts where the allotted space admits of extending them in proper regularity; accordingly as each tree is thus pruned and regulated, the general branches and shoots should be trained in regularity, and nailed to the wall, &c. about three, four, or five inches asunder, all at their full length, to the extent of their limited space.

Mr. Forsyth advises, in pruning these trees, never to shorten their shoots, as most of them produce the fruit at their extremities, the shortening or cutting off of which very frequently occasions the death of the shoot, at least of a great part of it. The branches, therefore, should be trained at full length. He has often seen the whole tree killed by injudicious pruning. Wherever the knife is applied, it is sure to bring on the gum, and afterwards the canker; which will inevitably kill the tree, he says, if no remedy be applied to the wounds.

The Morello, in particular, and the small early May cherry, bear both on the young wood of last summer, the fruit blossom-buds issuing immediately from the eyes of the shoots very abundantly, and upon small natural fruit-spurs arising on the two and three years' wood, and continuing on the older branches; but generally bear the most plentifully on the young wood: and, therefore, it is necessary, both in summer and winter pruning, to attend to this, and retain a general supply of the young shoots of each year, trained in plentifully in all parts of the tree in summer, of the most regular placed, as many as can be conveniently admitted with proper regularity; and in the winter pruning, making a general selection of the best well-placed shoots of last summer, to train in for successional bearers the ensuing season, cutting out the superabundant, with part of the naked former bearers occasionally, to make room for the young supply, leaving a terminal one to each mother branch, and thus train in the general branches and shoots horizontally, about three or four inches asunder at their natural length.

The standard cherry-trees should be planted twenty-one feet distance at least; but if for a whole orchard, twenty-four feet, or eight yards distant every way, will be requisite. The first shoots having been previously shortened in the nursery, if thought necessary to promote lower branches to form the head, plant them now with their heads entire, except just reducing any irregular growth, and suffer them to branch every way, and shoot in length as fast as they are able, not shortening any, and all the branches will soon form numerous fruit-spurs.

Little pruning is required for standard cherries, as too much use of the knife, in the larger wood particularly, causes them to gum and canker: all that is necessary is occasionally to retrench any very irregular growing branch, and all decayed wood.

In respect to old trees, Mr. Forsyth says, "he has headed down a great many cherry-trees, which were almost past bearing, and so eaten up with the gum and canker, that what few cherries they bore upon old cankered spurs were not fit to be sent to table;" and that "in the years 1790 and 1791 he cut, or headed down, fifty trees. The operation

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operation was performed in the months of April and May, in each year. These trees made shoots from three to five feet the same summer, bore fine cherries the next year, and have continued to bear good crops ever since. To the above trees he applied the composition. At the same time he cut down twelve trees in the same row, but did not apply the composition: these twelve trees all died in the second and third years after. They now," he says, "gather more cherries from one tree where the composition was applied, than they did from the whole number formerly; being also much larger and finer fruit. When cherry-trees are very old, and much injured by large limbs having been cut off, (which will," he says, "infallibly bring on the canker and gum, and, if no remedy be applied, in a short time kill the trees,) or if there are great spurs left standing a foot perhaps from the wall, the best way to bring them to have fine heads, and to cover the wall, is to head them down as low as possible; taking care to leave some small shoots, if there be any; if not, leave a bud or two at the ends of some of the shoots. Sometimes you will have a great difficulty to find any buds. If that be the case, in the spring, before you mean to head the trees, make some incisions in the branches. This should be done on different branches, at the most convenient places for filling the wall with good wood. The size of the incisions should be from one to two inches, according to the largeness of the branches; observing to make them just above the joint where the buds should come out. If you cut just below a joint, the shoot will die as far as the next bud or joint, and of course injure the tree, if no remedy be applied." He adds, that "the time for performing this operation is in March, April, or May." But this method of making incisions is only recommended where there are no young shoots or buds, and when the tree is in the last stage of the canker. Where you have a few young shoots or buds, he advises to cut down the head as near to them as you can, and to take great care to cut out the canker, till you come to the sound bark. The canker makes its appearance in these trees in the same manner as in peaches and nectarines, and may be easily discovered by an attentive observer. "If any gum remains, it must be cut or scraped off; the best time for doing which is when it is moistened with rain: you can then scrape it off easily, without bruising the bark. This operation is very necessary; and if it be neglected, the disease will increase rapidly." And wherever the bark or branches have been cut off, the edges should be rounded, and the composition applied to them.

It is observed, that the general way of pruning these trees has been to leave great spurs, which continue to increase till they stand upwards of a foot from the wall, and become as thick as a man's arm; but it must be observed, that cutting off from year to year the shoots that are produced from the spurs, increases the canker, till large protuberances, like wens, are formed on the branches, becoming very unsightly; and these occasion them to produce only small and ill-flavoured fruit, at a great distance from each other. When this is the case, the method he pursues is to head the trees down, as before directed. And if the young shoots are properly trained, they will produce fruit the following year; and in the second year, produce more and finer fruit than a young tree that has been planted ten or twelve years. The same writer remarks, that it has been a general complaint, that heart cherries are bad bearers, when trained up as wall-trees; but by pruning them as duke cherries, he has brought them to bear in the same manner; that is, he leaves a great many fore-right shoots in summer, tucking them in with some small rods run across

under the adjoining branches, to keep them close to the wall, and prevent them from being broken by the wind, and from looking unsightly. He advises, never to make use of the knife in summer, if it be possible to avoid it, as the shoots die from the place where they are cut, leaving ugly dead stumps, which will infallibly bring on the canker. These shoots may be cut in the spring to about a couple of eyes, as duke cherries, which will form a number of flower buds.

Mr. Forsyth indeed well observes, that as cherries are a very considerable article of traffic in the London markets, and the markets of most towns throughout the kingdom, employing such a great number of people during the summer season in gathering, carrying to market, and selling them, the raising of them is certainly worth any gentleman's while, especially as the trees may be rendered ornamental, as well as profitable, by planting them in shrubberies, &c. Gentlemen of small fortunes, who are at a great expence with their gardens and plantations, may in a great measure reimburse themselves by selling their cherries, and other fruit, (for which there will be plenty of chapmen,) and thus enjoy, at an easy rate, the pleasures of a rational and useful recreation. And he adds, that in all parts of the country, there are persons employed in collecting fruit for the markets, and to hawk it about from place to place; and surely it is much better to sell it to them, than to let it rot on the ground, or be devoured by birds and insects.

It is advised, when cherry-trees begin to produce spurs, to cut out every other shoot, to make the tree throw out fresh wood. When that comes into a bearing state, which will be in the following year, to cut out the old branches that remain: by that method you will be able to keep the trees in a constant state of bearing, taking the same method as before directed with the fore-right shoots. And great care should be taken to rub off many of them in the month of May, leaving only such a number as you think will fill the tree. By so doing, your trees will continue in a fine healthy state, and not be in the least weakened by bearing a plentiful crop of fruit. The reason is obvious: the great exhalation which would be occasioned by the sun and air, in the common mode of pruning, is prevented, by the composition keeping in the sap which nourishes the branches and fruit. And further: he cut some trees, as directed above, more than twelve years ago, that are now in as good a state of bearing as they were the third year after the operation, and likely to continue so for many years. He states, that a row of dwarf cherry-trees, that stood against an old paling, with an old thorn hedge at the back of it, (which every year so infected them with a blight, accompanied by an immense number of caterpillars and other insects, that, even in a fine year, they could not gather eight baskets from the whole row,) became so fruitful, after the hedge and paling were removed, that they gathered forty-two pounds a-day for six successive weeks, besides what the birds, wasps, and flies destroyed. He mentions the fact to stimulate market-gardeners and farmers, who have large orchards and gardens, to exert themselves in trying every method, however unimportant it may at first appear, to improve and render them more fruitful; and concludes, that the duke and heart cherries from these trees were as fine as any that were produced from wall-trees. And as they are much more productive, he has been induced to take up many old renovated trees from the walls, and plant them out for dwarf standards, supplying their places with pears, plums, peaches, &c. And further: that in all old gardens and orchards throughout the kingdom, and particularly Kent, whence the London markets are chiefly supplied with cherries,

cherries, the greater part of the old trees will hardly bear fruit sufficient to pay the expence of gathering it; but if the above method of pruning, &c. were practised, the owner would soon find his account in it, and be amply repaid for his trouble: the fruit would be much finer, and he would have five times the quantity that the trees produce in their present condition; the trees would be more tightly, and always keep in a flourishing and bearing state. But when old standard cherry-trees become decayed and hollow, he would recommend heading them down, as directed for wall-trees and dwarfs; to scoop out all the rotten, loose, and decayed parts of the trunk, till you come to the solid wood, leaving the surface smooth; then use the composition.

Method of forcing of Cherries.—This sort of tree may likewise be forced by artificial heat, in houses, so as to obtain fruit at an early season, as in April and beginning of May. And for this purpose the earliest dukes and May cherry are the proper sorts, but principally the former; trained both in standards, of four, five, or six feet stems, to elevate the heads near the top-glasses of the forcing-house, which are generally pruned to a small compass for that purpose; and in dwarf standards, with short stems and low heads; both of which, for this use, should be such as are previously trained in the full ground, till the heads are of three, four, or five years' growth, or till they have commenced bearers in some tolerable degree. The forcing-houses for this use are of different constructions, according to circumstances, and the other purposes to which they are applied. They have proper flues for fire-heat, and mostly internal borders of good earth, either in the back part for the taller trees, and in the front for lower; or sometimes, where no internal bark-pit is made, for bark-bed heat: the forcing being effected wholly by fire, the whole bottom space is entirely formed into a bed of earth of proper depth, and the trees planted in it in rows from the back to the front, in some regular gradation, according to their height; sometimes with dwarfs planted between the taller standards, and towards the front; and occasionally with dwarf trees in pots. In this sort of forcing, a very slight degree of fire-heat is sufficient; therefore, when there are back flues, they need not be employed, only that in the front being used.

The author of the Scotch Forcing Gardener observes, that where the situation is dry, the bottom a kindly sand, gravel, or clay, and the soil a sandy loam to the depth of two feet; the border will require no other preparation than being well enriched with stable dung, and, if possible, a little marle, which ought to be trenched and well mixed twice or thrice during the summer before planting. But where it is wet, the bottom a cankering gravel or cold clay, and the soil either a poor sand, gravel, or stubborn clay, care must be taken to render them otherwise, by paving the border to the breadth of twelve or fourteen feet, running a drain in front to carry off the wet, and removing the bad, and bringing in good soil, so as to compose a rich sandy loam to the depth of thirty inches at the wall, and twenty-four in front, allowing three or four inches for settling. If a new building is erected for cherries, it is immaterial, he thinks, whether the building or border is completed first, (provided the latter has a sufficient time allowed for the mixing and incorporation of the soil,) as the front wall and flue stand on pillars, whose foundations ought to be at least six inches deeper (if the border is not paved) than the soil. He considers about the first of January to be a good time for planting; although a month sooner or later at this season is of little consequence, as there must be no fire-heat applied the first year. Having

provided the necessary number of healthy, well-rooted, maiden, or *one-year-trained* May dukes, (as experience shews that no other cherry deserves a place in a forcing-house,) let them be planted against the trellis at the distance of eight, nine, or ten feet, according as the length of the house will best divide; filling-in the pits with vegetable mould from decayed tree leaves, and settling all with a little water. Riders, with five or six feet boles, which have been trained two or three years against a wall, and have produced a crop or two, should be provided to fill the upper part of the trellis, where they will yield a few crops before the dwarfs require their removal. These will generally produce a few fruit the first, and be sure to produce a full crop the second year.

The surface of the border should be forked over once a year, and a little well rotted dung occasionally worked into it.

In respect to the trees, he observes, that the dwarfs or principals being the only ones intended ultimately to fill the trellis, the riders being planted solely for the purpose of obtaining a crop or two while those are making their wood and forming their fruit-spurs, and, by being checked by their removal, may not be expected to put forth much young wood while they remain there, it will be unnecessary in pruning to thin them out much, only let them be dressed regularly to the trellis, and (where not absolutely requisite) divesting them of any shoots they may make, paying respect to their fruit-spurs only; as when they have served this purpose they will be of no further use. He says, that after planting, the dwarfs, if maiden trees, should be headed down to two or three eyes, in order to make them put forth vigorous shoots, to furnish the trellis from the bottom: and, if they have been one year in training, the bottom branches should be laid well down, and the rest dressed in a regular manner to the trellis, using strings of fresh matting to tie with; and be careful to allow sufficient room in the ties, as much mischief is done to fruit, especially cherry-trees, which are so apt to gum, if not allowed a sufficiency of room in the shred, or tie, such as will at least admit another of the same size along with it.

As these trees are apt to gum, and the branches decay, from the slightest injury, it would be imprudent to train them horizontally; in which case, the loss of a branch is supplied with much more difficulty than when trained in the fan manner. This last method he therefore recommends. And when the tree has produced its shoots to the length of five or six inches, they should be gone over and thinned, so as to enable the operator to lay them in at about the distance often of twelve inches; pinching off any that are produced fore-right, and which are, from their appearance, not forming for fruit-spurs; and, as they advance, let them be neatly laid in, and divested of any laterals they may produce. If all has gone well, at the end of the first year they will have produced shoots from twelve to thirty inches long, which should then be shortened to about two-thirds of their length. In the second season they will shoot vigorously, and begin to form many fruit-spurs on the preceding year's wood, which must be encouraged, for the production of a few fruit the following year. The trees should be kept clear of all superfluous and lateral shoots, laying the leading ones at the distance of eight or nine inches; and, at the end of the season, shortening a few of the strongest alternately, so as to make them break their buds in the spring in a regular manner; as they will not require to be any more shortened. And in the third season, they will produce a few fruit, make fine spurs and moderate shoots; which as they advance to the riders, room should

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should be given by lopping off their branches, or thinning away their foliage, so as to afford a free circulation of air and admission of sun. In the fourth season, they will produce a full crop of fruit; and often make such a progress towards the riders, that their presence becomes unnecessary; in which case, it will be advisable to sacrifice whatever fruit, or appearance thereof, there may be on them, to the encouragement of the principals. After the trees have filled their spaces, and have begun to produce plentiful crops of fruit, they will make little or no wood; and will require no further care, on the score of training, than to supply the place of any branch that from accident may die out or be destroyed. These trees, from their nature, bear very little artificial (especially fire) heat, on which account he would not advise the forcing of them too early, especially if there be no more than one compartment for their culture; since, in that case, there would not be a continued succession for the supply of the table, and furnishing a desert, till they came in on the open walls. He considers the first or middle of February to be an eligible time for the commencement of the forcing; but, in a new planted house, the third year ought to arrive before fire heat is applied. Were it not for the sake of other articles that may be placed or planted in the cherry-house, it would, he thinks, be better that the glasses were not put on the first season at all; but this is generally too great a sacrifice: however, if they are put on, a free circulation of fresh air, even in the night, ought to be encouraged. When, in the third year of planting, the trees have made good progress, plenty of fruit-spurs, and a reasonable hope of success is entertained, the glasses should be put on about the middle of January, plenty of air being admitted through the day, shutting them at night. On the first of February the fire may be lighted, which must be made so moderate, that, at eight at night, and eight in the morning, Fahrenheit's thermometer may not stand above 40° . In which condition it should be kept as near as possible till about the twentieth of the month; and then increased gradually to 45° : at which point endeavour to keep it till the fruit is fairly set. Afterwards increase the heat to 50° , but not more, till the stoning is over, and the fruit have begun their second swelling. Although, for the sake of the fruit, all danger is then past; yet, if too strong a fire heat is indulged in, it will have the tendency of drawing the shoots too weak: and therefore he would not advise that the air of the house, at the fore-mentioned hours, should ever pass 60° .

With regard to the admission of air, the house ought to be uncovered all the first season after planting: but, if this is not the case; and if, from the nature of what other plants are placed therein, it is imprudent to leave little air in the house in the night, it should be opened by sun-rise in the morning, having a large and free circulation all day, shutting it up at sun-set. However, when the month of May arrives, it ought, he thinks, to be entirely uncovered. In the second season, he advises, that the glasses be put on by the first of March, large portions of air being admitted, as directed above, and the glasses be removed by the first of August. From the commencement of the forcing, this article must be more particularly attended to; the first ten days after which, a very large share of air should be given, to prevent the buds from breaking too suddenly, and of consequence too weakly: besides, vegetation (in forcing) ought always to be brought on, as it were, by stealth: the juices flow more kindly; and the plant suffers the first impulse of reviving activity with more patience, than when

hurried on in a violent manner. But, after the buds begin to appear turgid, a more moderate quantity may be admitted; still having respect to the temperature of the house, and the prevention of frosty winds from hurting the bloom. At all events, advantage should be taken of sun-shine; which will allow a larger portion than at other times. Nevertheless, let no day pass (unless a severe frost) wherein less or more air is not admitted; and, in sun-shine, to the extent that the thermometer may not rise more than ten degrees above the fire-heat medium. After the crop is all gathered, if consistent with the welfare of the other articles contained in the house, the glasses should be removed, and the trees exposed to the weather till the next season.

When planted, the mould should be settled to the roots of the trees by a moderate watering; and if the house remain uncovered the first season, little attention, except in dry weather, will be required. Due attention should be paid the second year to keep the border in a moderately moist state, that the plants may grow freely; and when their growth is stopped for the season, withhold the water, that the wood may ripen perfectly before they are exposed to the weather. From the time the forcing is begun, plentiful waterings should be given to the border, until the bloom begins to open; and then in a moderate degree till the fruit is fairly set. After which, again increase the quantity till the fruit begins to colour; and then diminish the quantity by degrees till you entirely withhold it, which ought to be done sometimes previous to the fruit's being ripe. It is also observed, that washing with the hand-engine should commence with the day the fire is lighted; and, except from the time the bloom begins to appear till the fruit is fairly set, should be repeated thrice a week in the evening, and that with a considerable degree of force, till the fruit begins to ripen. And in the interval of washing, (*viz.* while in bloom, and till the fruit is set,) a little water should be poured on the flue every evening when the fire is at the strongest, which causes a fine agreeable steam to arise in the house, greatly to the benefit of the flowers and foliage. Soft and tempered water should be used at all times, and on all occasions.

With respect to the insects that infest the cherry-house, they are, the aphis, or green fly; the acarus, or red spider; the caterpillar, and the grub. The first, and least hurtful, is easily destroyed by a fumigation of tobacco; the second by the process of washing with the engine, which is indispensably necessary to the health and vigour of the trees. Therefore, when they begin to make their appearance at any time, the water, in the ordinary course of washing, should be thrown against the trees with greater force, making a point of beginning at the contrary end of the house each time; whereby, if you happen to miss any part the one way, you may strike it the other. The caterpillar and grub have given him more trouble than the preceding, or indeed any species of insect whatever; and, after trying a variety of prescriptions, being at much trouble and expence, he can venture to allure the reader, and the public, he has at last discovered a cure, which is as follows:

Take of soft soap, two pounds; flowers of sulphur, two pounds; leaf, or roll tobacco, one pound; nux vomica, two ounces; and oil of turpentine, a gill: boil them all together in eight gallons of soft or river water to six; and set the liquor aside for use. And any time in winter, at least a considerable time before the trees begin to vegetate, let them be all untied or unnailed from the trellis or wall; brush every part of the branches and buds clean with a soft

soft brush, such as is used for painting: make the liquor milk-warm; and, with a sponge, carefully anoint every part of the tree, trellis, &c. Dress the trees neatly to the trellis again; but use none of the old ties or shreds: and let this operation be repeated every winter. The first summer after anointing, there may be a few appear, whose eggs have, by being concealed, escaped the action of the liquor, which must be picked off, to prevent their breeding; but, if any, there will be very few, as it is of the most penetrating nature. But this liquor must on no account be used in summer, as it instantly destroys the foliage. Fruit-trees of all kinds should be anointed with this liquor every year; as it is equally destructive of every insect and their eggs which infest them.

In cultivating dwarf trees in pots or boxes, it is observed, that where there is an extensive variety of forcing, and a green-house or conservatory, cherries may not only be produced at an early season, but in a long succession, by removing the pots or boxes from one house to another. When there are twenty or thirty trees, they should be divided into four or five equal parts, to make as many successions; and be placed in equal rotation: first (in November or December) in the green-house, where they may remain till they are fairly set; then, in an early peach or vine-house, till they begin to colour; and lastly, in the pine or dry stove, to come to maturity. And a very rich compost, such as is used for cucumbers or melons, should be made use of, watering them frequently with the drainings of a dung-hill. They should also be washed or watered frequently over head with a hand-squirt or watering-pan; and be placed in the most airy situations.

The double-blossomed sort may likewise be increased by grafting or budding, as in the other varieties, upon any kind of cherry-stocks, and be trained both as dwarfs, half and full standards, to effect the greater variety in plantations and other places.

And the wild cherry is easily raised from seed, as the stones of the fruit; and any variety which affords large and fine fruit may be continued by grafting, &c. in which way it will bear sooner, for which a quantity of stones should be provided in autumn, when the fruit is dead ripe, and be sown in beds of light earth an inch and a half deep, when they will come up in the spring, and after having one or two years' growth may be planted out in nursery-rows, with their tops entire, training them up for standards, with stems six feet high, then letting them branch out above every way, to form heads.

They may be planted out as standards in orchards or any open grounds for the fruit, and in ornamental plantations of forest-trees, where they have a good effect.

The bird-cherry sorts may also be increased in the same manner, and likewise by layers, which will readily strike root, and be fit for planting out in one year. They will also grow well by cuttings planted in autumn.

And the last sort is capable of being raised by grafting, and sometimes by layers.

Method of Culture in the Laurel Kind.—These are readily increased by seed and cuttings: but as cuttings are the most expeditious mode, they are most commonly raised in that way.

In the first mode, the seeds should be sown in autumn, when ripe, in beds of light earth, near an inch deep, allowing them some protection in severe frosts in winter, either by hooping and matting the bed, or covering it with dry long litter; but suffering them to remain uncovered in mild weather. The plants come up in the spring, giving

occasional waterings in dry weather; and in the autumn or spring following, when the season is settled, planting them out in nursery-rows to remain two or three years, or till wanted.

The cuttings should be procured in August or September, in moist weather, from the same years' shoots, cutting them off from about eight, ten, twelve, or fifteen inches long, with about an inch of the old wood to the bottom of each, if possible, though this is not indispensably necessary: then strip off the leaves from the lower parts, and plant them in a shady border, in rows twelve inches asunder, planting each cutting half or two-thirds into the ground, giving water in dry weather, when those planted in August will be rooted the same year; and all in the following summer, shooting at top, perhaps a foot long, by the autumn; at which time, or in the spring after, they may be planted or bedded out in wide nursery-rows, to acquire strength, till wanted. In either of these methods the trees may be trained either bushy or of a shrub-like growth, or trimmed up to a single stem for standards.

These plants delight in a light loamy soil, which is not too moist.

The proper season for planting them out is in the early autumn, or spring, according to the soil. They are highly ornamental in clumps and plantations, in lawns, parks, or out-grounds.

Hedges are sometimes formed of the common laurel for ornament; but where this is practised, it should not be trimmed with garden-shears, which mangle and spoil the beauty of the large leaves: all necessary cutting should be performed with a knife, in order to preserve the leaves entire, so as to make a fine appearance.

PRURIGO, in *Medicine*, from *prurire*, to *itch*, seems to be nearly synonymous with *pruritus*, and to signify simply an *itching* sensation.

At present, however, it is commonly appropriated, after the example of Dr. Willan, to a state of disease in the skin, of which a *severe itching* is the principal characteristic, but which is also connected with an eruption of *pimples*, or *papule*. These pimples, however, as M. Long long ago remarked, are not numerous and conspicuous in proportion to the severity of the itching, but are sometimes few in number, and scarcely perceptible to the sight, while the itching is almost intolerable. "Pruritus enormes non semper densæ confertæque papulæ afferunt; paucæ vix aspectu notandæ occurrunt, quæ hominem convellant." (Long, de Morbis Cutaneis, cap. iii. art. 1. p. 2.) The papulæ are not very conspicuous, because they are of the same colour with the skin, slightly elevated, and somewhat flat; and it is only when much scratching or rubbing has been resorted to, for the relief of the itching, that they appear red and inflamed. They are less noticed, too, by an unpractised observer, on account of the appearance of a number of little dark scabs, which arrest his attention, as the most conspicuous marks of disease. These are small concretions of blood, and of a little serous fluid upon the points of those papulæ, which are excoriated by the action of the nails in scratching. These little dark scabs are, in fact, common to every eruption which is accompanied by excessive itching, where there is a papular, or even a small vesicular or pustular eruption; since they are the effect of the common operation of scratching to relieve that sensation; whence they occur in some varieties of lichen, and in scabies, or proper *itch*. With a view to the diagnosis, therefore, as the latter is a contagious disease, and the prurigo is not, an accurate examination of the *papula* in question will be requisite. In

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one form of the *itch*, which has been called *scabies papuliformis*, (see SCABIES,) the resemblance of the eruption to prurigo is very considerable: but the pimples in the former are found, if carefully examined, to contain at their apex a minute portion of fluid, being in fact papuliform vesicles; they are also more acuminated, and are inflamed or red, independently of friction; and when recently abraded, they present a little shining point of humidity at their tops. The lichen is also a pimply disease, somewhat approximating to prurigo; but the pimples in lichen are acuminated and inflamed, seldom, if ever, containing any fluid, and terminating in a slight mealy desquamation; and the sensation accompanying it is often a tingling and heat, rather than mere itching: it is likewise more distinctly connected with indigestion than prurigo. See LICHEN.

The prurigo has been divided by Dr. Willan, in his classification of cutaneous diseases, into three species, (exclusive of several local forms of the disease,) to which he gave the trivial names *mitis*, *formicans*, and *senilis*. But the appearances on the skin are much the same in all cases, except as to the extent and quantity of the eruption; and the sensations differ chiefly in the degree of their severity, or in the combination of different species of irritating feelings with the itching. In young subjects of sanguine habit, the eruptions are less extensive, and the itching less severe, and the disorder is more manageable by medicine, yielding often, indeed, spontaneously with a change of season, or from slight modifications of diet: whence the epithet of *mild* (*mitis*) may be appropriated to such cases with sufficient accuracy. In persons advanced in years, universal prurigo, in a violent and unyielding degree, so as to render existence occasionally a burden, has been mentioned by medical writers, from Hippocrates downwards, as a disease of common occurrence; and the epithet *senilis*, as indicative of the period of life in which it occurs, and the severity and permanency of the malady, which that age implies, is sufficiently applicable. But, in the middle age, the disease occurs under every degree of violence; and, both in that and in the decline of life, the sensation of itching is, in some cases, combined with various other painful sensations, which aggravate the sufferings, diminish the rest, and disturb the functions of the patient. These sensations have been variously described as pricking, burning, creeping, stinging, piercing pains, such as the crawling and biting of insects, the piercing of sharp and heated points, &c. might produce. These sensations, as well as the itching, are greatly aggravated by the scratching and friction which they call for, as well as by the impression of heat, or of cool air, by the warmth of bed, of hot rooms, of the direct rays of the sun, or of a fire, and by violent exercise, and even by the exposure on undressing, or getting out of bed: they are aggravated too by internal stimulation, as by distending the stomach with food, but still more by the use of high-seasoned and strong viands, and of fermented and spirituous liquors. When the peculiar sensations, above described, are present, the epithet *formicans* is appropriated to the disease; but it may be doubted whether there is any real specific difference in these forms of the complaint.

The causes of prurigo are by no means always obvious. It is certainly often connected with that heated and irritable state of the habit, which is the result of a stimulant diet, especially in hot weather; and sometimes with other derangements of the digestive organs. In old age, however, this state of the habit seldom occurs in those affected with prurigo, and it is sometimes seen in middle age in persons of lean form, and unhealthy complexion, and in those who

are weakened by an insufficient supply of nourishment, loss of sleep, hard labour, or other sources of exhaustion.

The method of treatment, therefore, adopted for the varieties of the disease, is somewhat empirical, and often very unsuccessful. A continued use of the tepid bath is generally productive of alleviation, under all circumstances; though in the young and plethoric, it is apt to produce some increase of irritation at first. The bath of Harrogate is deemed still more efficacious, if employed with perseverance for some months, even in the most violent state of prurigo formicans; and sea-bathing has sometimes cured the disease. In the more inflammatory forms of the disease, the use of sulphur, in repeated small doses, combined with nitre or soda, contributes to diminish the cutaneous irritation, and is occasionally adequate to the removal of the disease. The sulphuric acid is also beneficial in some instances under the same circumstances; and the oxygenated muriatic acid, taken in doses of a drachm in a glass of water, is said to have effected a cure. (See Bateman's Practical Synopsis of Cutaneous Diseases, p. 19.) It is common to resort to a course of active purgation, with the view of evacuating from the habit some supposed morbid humour, which is imagined to make its way to the skin, and produce the eruption; but these purgatives appear to be actually injurious, if they are violent or often repeated. The same observation is still more decidedly applicable to the sudorific medicines that are sometimes recommended in these cases; for they seldom fail to aggravate both the eruption and the distressing sensations accompanying it. Antimonial medicines and alterative doses of mercury appear to be altogether inefficacious.

Where the eruption is so general, as is usual in these forms of prurigo, the use of local applications, whether lotions or ointments, can scarcely be resorted to; and those generally recommended, containing sulphur, hellebore, zinc, mercury, &c. are either possessed of little efficacy, or are productive of increased irritation, especially in the young and plethoric. As a temporary alleviation to the itching, in such patients, a lotion containing a considerable portion of the aqua ammoniæ acetatæ, or a little diluted spirit, has sometimes been found very beneficial. See Bateman, loc. cit.

In irritable and sanguine habits, much benefit is to be obtained by cutting off the sources of internal stimulation, *i. e.* by a careful regulation of the diet. The mere omission of wine, spirits, and fermented liquors, will sometimes occasion a cessation of the disease; and the substitution of a light and simple diet, for the strong and high-seasoned viands which are commonly used, affords a no less salutary influence. The use of whey, milk, and aqueous fluids, as drink, and of vegetable and farinaceous substances, with a little plain animal food, should be adhered to as the general regimen; and all condiments, spices, vinegar, pickles, and crude or undressed vegetables, should be avoided, as well as salted and dried meats: for all these articles have a tendency to heat the skin by sympathy with the irritated stomach, although the acids and raw vegetables are often recommended as *antiscorbutics*, in these cases, from a misinterpretation of the term *scurvy*. We have known several examples of the immediate influence of vinegar upon the skin, exciting heat and tingling very soon after it was swallowed; and Dr. Withering considered the fact so common, that he asks, "Who has not observed the full scarlet flush upon the face after eating herrings or vinegar, after drinking acetous beer or cyder?" See his Treatise on Scarlet Fever, p. 62.

When the prurigo occurs in persons much advanced in

years, or in those who are enfeebled in habit by any of the debilitating causes before-mentioned, the mode of treatment must be somewhat different. The diet, though it must be still unstimulating and void of heating qualities, should be nutritious, consisting of soups, broths, and plain animal food, jellies, and amylaceous substances. And in respect to medicine, the decoctions of sarsaparilla, cinchona, serpentaria, and other tonic vegetables, with or without the carbonate of soda, or the mineral acids, are sometimes serviceable. The warm bath, and especially the warm salt water bath, persevered in for a considerable time, affords considerable relief; and the application of a lotion, containing some active stimulant, as spirit of wine, the oxy muriate of mercury, &c. is productive of much alleviation to the distressing itching. These lotions cannot, however, be employed without exciting great irritation, where the surface is excoriated by the nails. In old people, this form of prurigo is occasionally accompanied with a great disposition to the propagation of pediculi, or body-lice, and the mercurial lotion is also useful in destroying these insects. (See PRURITIASIS.) They sometimes, however, pertinaciously continue to be produced, and aggravate the distress of the patient, notwithstanding the assiduous application of the wash. In the cases, such as we are now referring to, the popular system of purging and sweating, with a view to evacuate morbid humours, is still more unsuccessful than in the other class, as it conduces to the increase of debility, which is already too great.

Local Prurigo.—The sensation of *itching* is often very distressing in particular parts of the body, where the papular eruption, before described, does not appear, and it arises from various causes. In the *arm-pits* and *groin*, and other parts where there is a frequent attrition of surfaces, or a folding of the skin, it is occasioned by a slight inflammation, called *Intertrigo*; which see. When it affects the *pubes*, it is usually the result of the presence of morpiones, pediculi pubis, or crab-lice, which penetrate and adhere tenaciously to the skin, but which are speedily destroyed by a little common mercurial ointment, or by any essential oil or spirits of turpentine. A very troublesome itching sometimes occurs in the *urethra*, which in men is usually sympathetic of some disease about the neck of the bladder, or of the irritation of stone or gravel in that organ; but Dr. Hunter remarked, that it sometimes takes place in women without any obvious cause, and is curable by the use of a bougie. These, however, are not so frequently the objects of medical treatment as the distressing itching which affects the *pudendum* in females, and which becomes a serious malady; for the sensation is incessant and scarcely tolerable about the labia and os vaginæ, so that it is scarcely possible to refrain from perpetual attempts to obtain relief by friction, or by refrigerant lotions, or to mix in society; and sometimes even a degree of nymphomania has been the consequence of the local irritation. This formidable affection is most frequently about the period when the catamenia have finally ceased; but less degrees of it are occasionally connected with the irritation of ascarides in the rectum, and sometimes with leucorrhœa. There is generally a certain degree of inflammatory fulness about the labia in these cases, which being alleviated by refrigerant applications, the itching subsides. Simple cold water, or solutions of lead, or of the cooling salts, diluted vinegar, lime water, with calomel, or, which is the most efficacious of all, with the corrosive muriate of mercury, constitute the lotions which are usually resorted to, and certainly afford relief.

Somewhat analogous to this is the prurigo *pedicis*, or a

teazing itching about the anus, which affects men of advanced age, and especially those of sedentary habits, and that independently of ascarides in the bowel or of the piles. It generally arises from a slight inflammatory condition of the part, with some degree of increased and morbid secretion from its glands. It is sometimes also connected with a slight psoriasis of the scrotum, when the itching becomes permanent and severe, disturbing the patient night and day. The lotions, which afford much relief in the preceding affections, are inefficacious in this; but the citrine ointment, properly diluted, or the ointments of the red oxyd and white precipitate of mercury, afford much alleviation. High living and stimulant ingesta, are found very prejudicial. See Willan's Treatise on Cutaneous Diseases; and Bateman's Synopsis; also Heberden's Commentarii, cap. 76; Sennert. Pract. lib. v. part. iii. § 1. cap. 8; and Mercurialis de Morb. Curand. cap. 3.

PRURITUS, a sensation of the skin, which incites the desire of using friction to the part, and is popularly termed *itching*. It is apparently the result of a slight determination of the blood, not amounting to inflammation, to the vessels of the part affected, as from the bites of small insects, &c.; and sometimes it is so severe as to claim the character of a disease. See PRURIGO.

PRUSA, in *Geography*. See BURSA.

PRUSANA, a town of Lithuania; 36 miles N.E. of Brzesk.

PRUSATZ, a town of Bosnia; 36 miles S. of Banjaluka.

PRUSKAU. See PROSKAU.

PRUSSIA, a country of Europe, imperfectly known to the ancients, who mention various tribes that possessed it, and the amber that formed a considerable article of commerce; derives its name, as some say, from the Pruzzi, a Slavonic tribe; but, according to others, from the name of Russia, and the Slavonic word Po, signifying near or adjacent. It is bounded on the N. by Lithuania, the Baltic, Pomerania, and Mecklenburg, on the E. by Lithuania, on the S. by Saxony and Poland, and on the W. by the Baltic, Mecklenburg, Pomerania, Hildesheim, and several of the German states. But it is not easy to settle the fluctuating boundaries of this kingdom, or to ascertain the dominions which it may permanently comprehend. Besides the acquisition of Silesia, and a third part of Poland, its territories have undergone several alterations in the course of the late war, and now it is terminated, other changes will occur, upon which its extent must necessarily depend. Of the acquisitions made by Prussia, we may enumerate Hildesheim, Paderborn, Munster, Erfurt, Blankenhayn, Untergleichen, Eichsfeld, Muhlhausen, Nordhausen, Quedlinburg, Essen, Werden, Elten and Ihrford; and of its cessions we may mention Cleves, Gelders, and Moers, besides mutual cessions, which took place between Bavaria and Prussia in 1803. Exclusive of small detached territories, the kingdom of Prussia, according to the statement of Mr. Pinkerton, now extends from Hornburg and the river Oker in the country of Halberstadt, the farthest western connected district, to the river Memel, or about 600 miles. The breadth, from the southern limit of Silesia to Dantzick, exceeds 300 miles. On the E. and S., he says, Prussia now borders on the dominions of Russia and Austria, and the western limits adjoin to the bishopric of Hildesheim. Before the recent acquisitions in Poland, the number of Prussian subjects was only computed at 5,621,500, in a total extent of 56,414 square miles, that is, about 99 to the square mile. At present they probably amount to about eight millions; including

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ing the margraviate of Anspach and Bareuth, computed at 400,000; and the last acquisitions in Poland at 2,100,000 inhabitants. Prussia, however, has recently ceded the countries of Anspach and Bareuth to the French arrangements in Germany. It has also ceded Neufchatel and Vallengin, assigned, as an independent principality, to marshal Berthier. We have, however, more accurate statements from German writers. Krug (*Abriss der Neuesten Statistik des Preuss-Stock.* 1805) estimates the superficial extent of the contiguous provinces at 80,800 square miles, and that of the detached territories at 8,800. Hassel (*Statistischer Unvrifs,* 1805) gives the extent of the Prussian acquisitions in Poland, in 1793 and 1795, at 31,824 square miles. The original population of Prussia appears, from Tacitus and Pliny, to have consisted of the Peucini and Æstii, Gothic tribes bordering on the Venedi, who were Slavons. The amber of the Æstii, who seem to have been merely a tribe of the Peucini, continued to be celebrated in the time of Theodoric; but at what precise period these original inhabitants were expelled, or subdued, by the Slavonic tribes on the east, remains uncertain. It is sufficient to observe, that the Slavonic tribes, who extended widely over the north of Germany, after the old Gothic inhabitants migrated towards the fertile regions of the south, in consequence of the decline and fall of the Roman empire, were repelled by the knights of the Teutonic order in the 12th and following centuries, who destroyed great numbers of them, and in some measure restored the original Gothic population. Nevertheless, one-half of the Prussian population, as Pinkerton conceives, must still be considered as Slavonic; and to the former Pomeranians must now be added a numerous accession of Poles. One of the most singular features in the geography of these regions, during the middle ages, is the existence of Julin, a city of great extent and commerce on the right bank of the Oder in Pomerania, which was destroyed by Waldemar I., king of Denmark, so that the name hardly now exists in a place called Wollin. Farther to the east the Slavonic tribes on the Baltic continued Pagans to a late period; and the country was little known or visited, except by a species of crusaders, who went to assist the Teutonic knights in subduing the Saracens.

As a kingdom, Prussia is of recent origin; and being composed of several ancient states, its historical epochs and antiquities are complex. Without mentioning the smaller distant provinces, Prussia may be considered as comprehending four large divisions, *viz.* the electorate of Brandenburg, the kingdom of Prussia Proper, the large province of Silesia, and a third part of the ancient kingdom of Poland. The family which now rules these extensive domains was originally the electoral house of Brandenburg, which is derived from Thassilo, count of Hohenzollern, who lived about the ninth century. Brandenburg had been for some time chiefly possessed by Slavonic nations; but Sigefred, a Saxon count, who was appointed margrave A.D. 927, soon raised it to considerable distinction. In 1373 the emperor Charles IV. assigned Brandenburg to his second son Sigismund, who in 1415, being then emperor of Germany, sold this margravate and electorate to Frederic, burgrave of Nuremberg, for 400,000 ducats. Frederic, the ancestor of the present race, displayed considerable abilities. Joachim II., elector of Brandenburg, embraced the Lutheran religion in 1539, and this has ever since been the prevailing system of the state. John Sigismund became duke of Prussia in 1618. Frederic William, surnamed the great elector, succeeded his father in 1640; and in 1656 compelled the king of Poland to declare Prussia an independent state, as it had formerly been held of the Polish sovereigns. In 1688 he was suc-

ceeded by his son Frederic III., who, having supported the emperor in the contest for the Spanish succession, was by him declared king of Prussia, and proclaimed at Konigsberg on the 18th day of January 1701. Frederic William I. ascended the throne in 1713; and he was the father of that great prince Frederic II. who ascended the throne in 1740, and died in 1786, after a long and glorious reign, of which the most memorable event was the acquisition of Silesia from the house of Austria in 1742. The next important event was the completion of the Prussian acquisitions in Poland. (See POLAND.) The history of Prussia Proper will naturally occur under the article *TEUTONIC Knights*; and that of Silesia under *SILESIA*. Few ancient monuments are to be found in a country, where even a rude knowledge of the arts is comparatively so recent. Some Slavonic idols, cast in bronze, constitute almost the only pagan antiquities; and the castles and churches, erected after the introduction of the Christian religion, are not of sufficient importance to merit attention.

The following estimate of the Prussian population is compiled from the subdivisions of Hoeck, 1801;

Eastern Prussia	-	-	-	940,000
Western Prussia	-	-	-	521,625
Southern Prussia	-	-	-	1,100,000
New Eastern Prussia	-	-	-	700,000
A part of Poland incorporated with Silesia				74,000
Pomerania	-	-	-	472,957
Brandenburg	-	-	-	755,577
New Marck	-	-	-	279,584
Magdeburg	-	-	-	275,262
Halberstadt	-	-	-	111,875
Minden	-	-	-	67,952
Ravensburg	-	-	-	81,812
East Friseland	-	-	-	102,594
Cleves	-	-	-	100,000
Maers	-	-	-	17,000
Mark	-	-	-	121,984
Gelder	-	-	-	48,000
Tecklenburg	-	-	-	17,234
Lingen	-	-	-	23,432
Silesia	-	-	-	1,747,065
Anspach	-	-	-	215,256
Baireuth	-	-	-	205,440
Neufchatel and Valengin	-	-	-	42,500
				8,021,149

The same author, allowing for different territorial arrangements gained by Prussia, and other causes of augmentation that have occurred since the year 1801, reckoned the number of inhabitants at 9,500,000 in 1804. Hassel gives 9,856,000, and Krug 9,700,000. The rapid increase of population in the Prussian dominions must have rendered former accounts of the number of inhabitants in the principal towns very inaccurate. The annexed table exhibits a comparative statement of Mr. Pinkerton's estimates, with those of later German authors.

	According to Mr. P.		Hassel.		Krug.
Berlin	142,099	1803.	153,128	1803.	153,000
Breslaw	52,000	1803.	60,950	1803.	60,000
Warsaw	66,572	1801.	63,358	1803.	64,000
Dantzick	36,000	1801.	46,213	1802.	47,000
Magdeburg	26,000	1798.	30,611	1802.	32,000

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Hassel reckons that of a population of 9,856,000 persons, 5,187,900 are Protestants, 4,352,000 Roman Catholics, the remaining 316,100 being Jews, Greeks, &c. And Krug, who computes the population at 9,700,000, reckons 4,800,000 Lutherans; so that the Protestants are considerably more numerous, not only than the Catholics, but than all the other sects put together. The Prussian army, according to Hoeck, amounts to 178,897 infantry, and 39,867 cavalry; forming, with artillery, &c. a total of 237,089. Another author says, that the army contains 224,144 men. Hoeck reckons the revenue at 36,000,000 dollars, or about 6,000,000/ sterling; and Hassel, who quotes him and many other writers upon the subject, computes it at from 38 to 40,000,000 dollars, or about 6½ millions.

The government of Prussia is absolute. Its military force we have already mentioned: at present it does not rank among the maritime powers. The manners of the Prussians are observed to be very different from those of the other Germans. Compared with the Saxons, who are a lively and contented people, they appear dull and gloomy, which some have ascribed in part to their military government. The ruling language of Prussia is the German. The literature of Prussia is of recent origin; nevertheless it may boast of Cluverius, an eminent geographer, Copernicus, so well known as an astronomer, Regiomontanus of Königsberg, Leibnitz, Wolfius, Ramler the poet, Nicolai, an original writer of romances, Busching, Humboldt, Klaproth, &c. &c. Prussia, however, has not yet produced any artists, painters, sculptors, or architects, of distinguished reputation. This country has several universities, such are those of Halle, which in 1802 had 634 students, of Erlangen, which in 1801 had 300 students, of Königsberg, which in 1802 had 300, and that of Frankfort on the Oder, which had 180. There is also a royal school at Posen.

The chief cities and towns of Prussia are Berlin, Königsberg, Breslaw, Warsaw, Dantzick, Brandenburg, Frankfort on the Oder, Potsdam, Magdeburg, Stettin, Elbing, Glogau, Hirschberg, and Schweidnitz; which see respectively. Although inland navigation has not been attended to in the degree which it deserves, and the most important canals are not remarkable for their extent; yet, by joining the Elbe, the Oder, and the Vistula, they form an uninterrupted line of navigation, of six or seven hundred miles in length; and the traffic upon them, though fettered by the difference of duties in different provinces, by extravagant tolls and other impediments, is nevertheless very considerable.

If we except the linens of Silesia, the manufactures of the Prussian dominions are of small importance. Yet for home consumption they afford glass, iron, brass, paper, and woollen cloth; and Frederic II. introduced a small manufacture of silk. The exports of Dantzick consist almost entirely of timber, corn, tallow, and such articles. Amber constitutes a monopoly of this country; but its commerce is become insignificant. Among the considerable exports may be reckoned excellent timber of all kinds, skins, leather, flax, and hemp; and the linens of Silesia are sent into Holland, and sold under the name of Dutch manufacture. In return Prussia receives wine, and other products of more southern and favoured countries. The exportation of amber amounts to near 200 tons annually. Brandenburg exports timber from Hamburg, to the amount of one million of dollars. In Silesia (in 1796) 40,603 persons were employed in the linen manufacture, and 13,540 in the woollen. Merd exports much timber to England.

The climate of the Prussian dominions is, upon the whole, cold and moist. That of *Brandenburg*, (which see,) the

whole of which is an extensive level of sand, and that of *Pomerania* (which see), may be regarded as less humid than that of Prussia proper, which, as Busching says, has about eight months of winter, the autumns being often deluged with rains. The northern part of *Poland*, which has fallen under the Prussian sceptre, abounds with forests and marshes, which cannot contribute to the salubrity of the air. The lower parts of *Silesia* (which see) are regarded as the most healthy and fertile provinces of the monarchy; but the southern and western parts of that duchy, bordering on elevated mountains, being covered with snow, are exposed, even in summer, to severe freezing gales. Prussia proper formerly abounded in woods, and is more fertile than Brandenburg; and this is also the case with respect to the immense plain of Prussian Poland. The soil of this latter territory is loamy and fertile. Prussia proper and the Polish provinces yield every kind of grain and esculent plant that can flourish under such a latitude. The soil of Prussia proper, however, is represented by Mr. Marshall as sandy and ill cultivated; nevertheless the peasants, though oppressed by heavy taxation, being free from the wanton extortions and capricious personal services exacted by the Polish aristocracy, displayed signs of comparative ease and prosperity. The soil being light, two oxen, or sometimes even a small horse and cow, are sufficient to draw the plough. The chief crop, according to this writer, was buck-wheat, which was found to be more profitable than barley; and this grain was generally cultivated, along with a few Swedish turnips, except in the vicinity of Dantzick, where abundance of manure assured plentiful crops of wheat.

The chief rivers of the Prussian dominions are the Elbe, the Spree, the Oder, the Vistula, the Pregel, and the Memel, forming, in part, the Prussian boundary on the east. The lakes of Prussia are numerous; especially those of the eastern part; among which may be enumerated the Spelding see; and to which class we may refer those inland sheets of water, called "Haffs," which are formed at their estuaries by the rivers Oder, Vistula, and Memel: such are that of the Oder, styled *Grass Haff*, that of the Vistula, or *Frisch Haff*, and that of the Memel, or *Curisch Haff*; which see respectively. The only mountains in the Prussian dominions are those of Silesia. (See *SUDETIC Chain*.) In the N.W. parts of Silesia are also detached mountains of considerable height, as the Spitzberg, and Gratzberg, the Ruheberg, the Georgenberg, and the Reichenbach. According to Fabri, the Silesian mountains yield some silver, tin, copper, and cobalt, with considerable quantities of calamine, lead, and iron; and there are quarries of marble, freestone, alabaster, slate, and potters' clay. Coal abounds near Schweidnitz. Woods and forests abound in Prussia proper, and in the recent Polish acquisitions. Towards Hungary, Silesia presents a continuation of thick forests, which conspire with the elevated mountains to form an impenetrable barrier.

The breeds of horses and cattle in Prussia are not deserving of particular mention, and few parts are adapted to afford any excellent breeds of sheep. The race of the urus, or large and ferocious wild cattle of Lithuania, which also appeared in Prussia proper, is almost extinct. Among the wild animals may be mentioned the marmot, a species of castor, the lynx, the bear, and the elk. In the Oder is sometimes found sturgeon of a large size. In the southern districts of Silesia were formerly mines of gold and silver, and mines of copper and lead still exist; and here are considerable founderies of iron. In the Silesian mountains are also found chryso-prase, agates, jaspers, and clear crystals of quartz, vulgarly called diamonds: coal occurs in various parts of Silesia, and the level districts present some good peat-moors. But the

most distinguished and peculiar production of Prussia is *amber*, (which see,) affording yearly to the royal revenue about 5000*l.* This is chiefly found on the Samland shore of the Baltic, near Pillau, on a neck of land formed by the Frisch Haff, which seems to have been the chief seat of this mineral from the earliest ages. Mention is made of an amber mine, in Prussia, 98 feet in depth, where the amber is found between two salbands of carbonated wood, and sometimes adherent. We ought not to omit mentioning salt, which is calculated to afford about 300,000*l.* yearly to the state. The salt springs at Halle are said to be the most productive in the known world. Silesia presents one spring of hot water at Warmbrun, near Hirschberg; and this is said to be the only mineral water worthy of notice in the Prussian dominions.

PRUSSIAN BLUE, in *Chemistry*, a colour used by artists and painters, of a fine blue. It is composed of prussiat of iron, and the earth precipitated from alum, or pure alumine.

Under the article *PRUSSIC Acid* we refer to the history of this substance. We shall here give the methods employed in the large way for manufacturing Prussian blue, as practised on the continent and in this country.

The first method employed to obtain Prussian blue, was first to calcine dried bullock's blood with potash, in a crucible at a red heat. The mixture was now poured into a quantity of water. During the heat, the animal substance afforded the prussic acid, which was caused by the potash forming the prussiat of potash. This compound dissolved in the water, constituted what was then called the Prussian lixivium. To this was added a mixture of sulphate of iron and sulphate of alumine, in a state of solution. The prussic acid takes the iron, while the potash combines with the sulphuric acid. The excess of alkali precipitates the alumine from the alum, which becomes mixed with the prussiat of iron, and forms the substance which, when separated from the liquid, washed and dried, forms a blue concrete mass, called Prussian blue. When an excess of sulphate of iron is used, the excess of alkali will precipitate the iron in the form of an oxyd, which soon becoming yellow, gives the mass a green colour, which arises from the yellow precipitate being mixed with the blue. In this case the addition of some acid will be necessary to take up the oxyd of iron, in order to produce the change from green to blue. The muriatic acid is generally employed. It is better, however, not to have to add an acid at this stage of the process, since it in common combines with the alumine which is essential in forming a body for the colour, as well as to dilute the colour.

It is now certain that the black oxyd of iron, which is that combined in green vitriol (sulphate of iron), does not form a perfect blue with prussic acid. The colour is at first green, and does not become blue but by exposure to the air, or by the addition of oxygen in some way or other. The oxyfulphate of iron, which in the state of solution is of a reddish-brown colour, contains the red oxyd of iron. When the prussiat of potash is added to this solution, a deep blue precipitate is instantly formed. Some mineral waters in the vicinity of coal-mines contain a great quantity of the oxyfulphate of iron, as well as some sulphate of alumine. Such a situation would be a desirable object for the manufacturer of Prussian blue.

A great variety of animal substances may be employed for producing the prussic acid besides blood. The horns, hoofs, and the refuse of the skins of animals, have all been employed with success for this purpose. The refuse leather of shoemakers and curriers might be used to good purpose.

PRUSSIAN Green. See *GREEN* and *PRUSSIC Acid*.

PRUSSIATS, in *Chemistry*, a class of salts formed by the prussic acid with the different alkalies, earths, and metallic oxyds. These with the latter are generally insoluble in water. Two of the earths form insoluble salts with the prussic acid; namely, yttria and zirconia. The only metallic prussiat which appears to be soluble, is that of mercury, exclusive of the metallic bases of the earths and alkalies.

For combinations of prussic acid, see the different bases, as potash, soda, iron, &c.

PRUSSIC ACID, a substance which possesses some of the properties of an acid in its combinations with earths, alkalies, and metallic oxyds, and has been classed among the acids. If, however, the doctrine of Lavoisier be correct, it is not entitled to be classed among these bodies, inasmuch as it has not been proved to contain oxygen.

This acid in its pure state is a liquid as clear as water, and extremely volatile. Its most conspicuous property is that of precipitating metallic oxyds of different colours. With oxyd of iron it forms a beautiful blue precipitate, and with the oxyd of copper it forms a pigment of an intense brown colour.

It was first discovered, in combination with potash, by a colour-maker of Berlin, of the name of Diesbach. He procured some alkali from Dippel, a celebrated chemist, for the purpose of precipitating the colouring matter from cochineal, with which alum and green vitriol were also dissolved. The alkali which he added for that purpose produced a beautiful blue precipitate. Dippel had been heating the alkali with some animal matter, for the purpose of obtaining an animal oil, for which he became celebrated. The prussic acid was formed and united to the alkali, which caused the blue precipitate in Diesbach's solution. Dippel afterwards made this blue precipitate for sale, which he kept a secret for some time. It was called Prussian blue, from the place of its discovery.

This substance, which became celebrated for its fine blue colour, was sold at a great price, and became a subject of research with other chemists. Dr. Woodward got some information of its preparation from Germany, and published an account of the process in the *Philosophical Transactions* for 1724. He recommended four ounces each of nitre and tartar to be projected into a red-hot crucible, for the purpose of procuring a tolerably pure potash; to this he added four ounces of dried bullock's blood, mixing them intimately. These were put into a covered crucible, and heated in a moderate red heat, till they ceased to give out smoke, keeping them at a low red heat for some time afterwards. The contents of the crucible were now thrown into four pounds of water, and boiled for some time. The clear liquor was now decanted, and fresh water boiled upon the residuum, for the purpose of extracting all the soluble matter. The separate clear washings being collected, the mass was evaporated to four pounds. He then dissolved one ounce of green vitriol, and eight ounces of alum, in four pounds of boiling water. He then mixed the above liquid with this solution, from which was precipitated a substance of a greenish-blue colour. To this was added muriatic acid, till the precipitate assumed a fine blue colour. This powder, being separated and dried, assumed the form of a hard blue substance, which was called Prussian blue.

It was soon found by other chemists, that almost any animal substance heated with an alkali, afforded a blue precipitate with iron. Geoffroy and Macquer conceived, that the alkali combined with the phlogiston of the animal substance, which it gave up to the iron, reducing it to its metallic form, from which they accounted for the blue colour.

PRUSSIC ACID.

The latter chemist found, that Prussian blue lost its colour by heat, leaving the iron in the state of red oxyd. He found also, that when Prussian blue was boiled with an alkali, it lost all its blue colour, and farther found, that the alkali had acquired the property of precipitating iron of a blue colour from a solution of that metal.

Little more was discovered relative to the prussic acid, till the researches made in it by the celebrated Scheele in 1782 and 1783.

The first new fact he observed in the combination of this acid with potash, which till this time had been called the phlogisticated alkali, was its losing the property of precipitating iron of a blue colour, by exposure to the air for some time. He rightly suspected, that the substance which combined with the alkali, giving it the property of producing the blue precipitate, was disengaged from the alkali by the carbonic acid of the atmosphere. To verify this conjecture, he exposed the alkali to carbonic acid gas, and soon found that it deprived the liquid of the property of producing the blue colour with iron. He further confirmed this opinion, by placing in the same vessel with the gas, over the liquid, a slip of paper which had been dipped into a solution of iron, and a little alkali dropped on the paper to precipitate some iron without leaving an excess of alkali. No sooner did the carbonic acid disengage the prussic acid, which becoming volatile, rose into the upper part of the vessel, than the paper began to assume a blue colour, arising from the volatile acid combining with the iron. That this effect was produced by the superior affinity of the carbonic acid for the alkali above the prussic acid, was proved by other acids having the property of disengaging the colouring matter.

This very ingenious experimenter, with a view to obtain the prussic acid in a separate state, mixed ten parts of Prussian blue in powder, with five parts of red oxyd of mercury, to which he added thirty parts of water. On boiling the mixture a few minutes, the blue colour disappeared, the liquid at the same time assuming a greenish-yellow colour. This liquid was separated by the filter, the residuum being washed with boiling water, and the washings added to the filtered liquid. In this process, the oxyd of mercury separated the iron in the state of red oxyd, and at the same time combined with the prussic acid, forming a soluble compound. This solution he now poured upon $2\frac{1}{2}$ parts of very clean iron filings, adding at the same time one part of strong sulphuric acid. The iron became oxydated by the mercury, and dissolved by the sulphuric acid, the mercury being reduced to its metallic form. The colouring matter of the Prussian blue was at the same time set free, and being volatile, was separated from the other substances by distillation with a gentle heat. The prussic acid he thus obtained in a liquid form. A small portion of sulphuric acid came over at the same time, which he afterwards separated by a second distillation from carbonate of lime.

By the distillation of Prussian blue, he was inclined to suppose that the colouring matter was a compound of ammonia and oil, but soon abandoned this idea, when he found it impracticable to form it of these constituents. Supposing, again, that it was a compound of ammonia and charcoal, he mixed charcoal and potash together in a crucible, and kept them in a red heat for some time. He then pushed to the bottom of the mass small pieces of sal ammoniac (muriate of ammonia.) As soon as the fumes of the salt had escaped, he poured the whole, while red-hot, into water. On examining the solution, he found that the colouring matter had been formed.

We are particularly indebted to Berthollet, for the true

analysis of prussic acid; he found that it was composed of hydrogen, azote, and carbon, forming a peculiar substance, so that although Scheele had reason to conclude it a compound of carbon and ammonia, Berthollet drew a very different conclusion, yet both agreed in its being formed of the same constituents.

The latter chemist found, that when oxymuriatic acid is mixed with prussic acid, the former loses its oxygen, assuming the form of common muriatic acid. The prussic acid, which takes the oxygen, becomes more odorous and volatile, and acquires the property of precipitating iron, not of a blue, but of a green colour. This he has denominated oxyprussic acid.

Scheele obtained the prussic acid in the form of colourless liquid. It had a strong smell, resembling peach blossom and bitter almonds. It has a sweetish acid taste, having an irritating effect upon the tongue and throat. It is said to be very poisonous. The deleterious effects of the bitter almond, and the kernels of several fruits, are said to arise from the presence of this acid.

The prussic acid has been obtained in a state of greater purity than that obtained by Scheele. For this discovery we are indebted to Gay Lussac. An account of his experiments is given in the *Annal. de Chim.* vol. lxxvii. p. 128.

He put the prussiate of mercury into a retort, and separated it in a similar way to that used by Scheele. He provided several receivers, with two necks each. The first, which was connected with the retort by one of its necks, contained a mixture of carbonate of lime and dry muriate of lime. The first was to take up any sulphuric acid which might come over, and the latter to arrest the progress of the water which might come over with the acid. The first receiver was connected with the second, that with a third, and so on to four. Each receiver was surrounded with a freezing mixture. A gentle heat being applied, the acid came over into the first receiver, where it became deprived of its water. The pure acid, which was highly volatile, was carried forwards to the next receiver, where it became condensed. When the freezing mixture was removed from the receiver containing the prussic acid, and a gentle heat applied, it passed over to the next receiver. The latter receiver, being similarly treated, caused it to pass to the next in succession, and so on to the last. By this means acid is obtained in a state of complete purity, and possesses the following properties.

It appears in the form of liquid, perfectly colourless. Its taste is first cooling, but afterwards acid and irritating; it boils at 79.7° of Fahrenheit. Its density at 44.6° Fahrenheit is .70583, water being 1. At 50° it supports 14 inches of mercury. At 68° , if it be exposed under any given volume of air, it increases the elastic volume five times, provided a sufficient quantity of the liquid be present. It becomes solid at -50° . If a drop of it be exposed at the end of a glass rod, the evaporation is so rapid that the drop freezes.

The prussic acid in its simple form is applied to no use. Its greater volatility may present some advantages in producing great cold. Combined with lime, and with potash and iron, it is employed as a sensible re-agent in detecting the presence of iron in mineral and other situations. It forms insoluble compounds with the metallic oxyds, and hence is of importance in chemical analysis. See *PRUSSIAN Blue*.

Blood appears to be the most proper substance for affording it, from the facility with which it may be obtained. The great nuisance attendant on the drying of blood may be obviated by distilling it, and burning the fetid fumes with the inflammable gas furnished at the same time. In this process a large quantity of carbonate of ammonia may be obtained. The residuum

in the retort is a shining black coal, which, when calcined with potash, will furnish the same quantity of prussic acid, which the blood would have furnished in any other state less dried.

This carbonaceous matter is pretty much the same, whether furnished from the blood or other parts of animals, perhaps with the exception of the bones.

In the large way, one hundred pounds of potash are put into a thick iron vessel, capable of bearing a brisk red heat for a length of time. The fire is to be raised till the potash is fused. Twenty-five pounds of the powdered coaly residuum above-mentioned, are now to be rapidly stirred into the fused potash. In half an hour twenty-five pounds more carbon must be added, treated as before, and at the end of a similar space of time, another twenty-five pounds. The mass is now to be constantly stirred, the heat being all the time sufficient to keep it in a soft and plastic state for several hours.

During the formation of the prussic acid, a reddish coloured flame appears upon the surface of the melted mass. The finishing of the process is marked by the flame changing from a red to a pale blueish tinge. At this period the mass is to be removed as speedily as possible into a large vessel of boiling water, and stirred, to promote the solution of the prussiat of potash. Let the dregs settle, and decant off the clear liquor. Add fresh water, and apply a boiling heat to dissolve what may remain, and decant the second liquor, and so on till the water ceases to have any considerable taste. The several decantations are now mixed together. If the liquor is not sufficiently clear, it must be filtered through flannel or linen.

The alum and green vitriol, which are now added to form the blue precipitate, are in very different proportions, from equal parts, to the proportions of two to one. The quantity of these mixed salts for the above quantity of prussiat of potash is about two hundred pounds. They are first dissolved in water and then added.

The precipitate of Prussian blue is immediately formed, and when it subsides the liquor is to be poured off. Boiling water is added from time to time, for the purpose of washing off the sulphate of potash. The pulpy mass of Prussian blue is now to be put into bags, and pressed. The mass is then exposed to the air to dry, and it assumes at the same time a deeper colour, and acquires a hard stony consistence, exhibiting a bright glossy fracture of a bronzy hue, but when ground for the use of painting, is a superb blue.

Lime and alkalies decompose Prussian acid, and hence destroy its colour, producing a dirty red. Soap which contains alkali has the same effect. See *Prussiat of Iron*, under IRON.

PRUTH, in *Geography*, a river of Poland, which rises in the S.W. part of the new kingdom of Galicia, on the borders of Hungary, passes through Moldavia, and joins the Danube near Renay in Bessarabia. In the year 1711, Peter the Great, in a war with the Turks, encamped his army on the banks of this river, not far from Jassy, in a situation so disadvantageous, that he seemed to have no hope but that of cutting his way through the enemy; with this resolution he retired to his tent, in an agony of despair, absolutely prohibiting any person from entering it under pain of death. At this important juncture, the principal officers, and the vice-chancellor Shaffirof, assembled in the presence of Catharine, and drew up certain preliminaries, in order to obtain a truce from the grand vizier. In consequence of this determination, plenipotentiaries were immediately dispatched, without the knowledge of Peter, to the grand vizier; and a peace obtained upon more reasonable

terms than could have been expected. This is called the "peace of Pruth."

PRUYM. See PRUM.

PRUYSEN DROOGTE, a rocky islet at the east entrance of the straits of Sunda. S. lat. $5^{\circ} 20'$. E. long. $106^{\circ} 48'$.

PRYCK-SPUR, in *Military Antiquities*, a sort of spur, which came into use about the time of the conquest, having only a single point, like the gaffle of a fighting cock. The knights of the three or four reigns succeeding the conquest used this kind of spur, after which the rouelle, or wheel-spur, came in fashion.

PRYGEE, in *Geography*, a town of Pegu; 38 miles N.E. of Perfain.

PRYK, a kind of service or tenure, and, according to Blount, signifies an old fashioned spur with one point only, which the tenant holding land by this tenure, was to find for the king. "Per servitium inveniendi unum equum, unum faccum, et unum pryk in Guerra Walliæ." 1 Ric. II. And in the time of king Henry VIII. light horsemen in war were called *prickers*, because they used such spurs or pryks, to make their horses go with speed.

PRYMISL, or PRSIBISLAW, in *Geography*, a town of Bohemia, in the circle of Czaclau; three miles E. of Deutsch Brod.

PRYNNE, WILLIAM, in *Biography*, a learned lawyer and antiquarian, celebrated as a leader among the Puritans in the reign of Charles I., was born at Swanwick, in Somersetshire, in the year 1600. He was educated in grammar learning at Bath, and afterwards entered at Oriel college in Oxford, where he remained till he had taken his bachelor's degree at about the age of 20. He then was entered at Lincoln's Inn for the study of the law, which he pursued with great assiduity, and became in process of time barrister, bencher, and reader of the society. By his attendance in early life on the lectures of Dr. John Preston, he became attached to the principles of Puritanism, and in 1627 he appeared as a writer. It was not, however, till the close of 1632, that he published an elaborate work, entitled "Hittorio-matrix," in which he inveighed very bitterly against theatrical exhibitions and public spectacles of all kinds. The book was regularly licensed; nevertheless, on account of some reflections against women actors, which were supposed to be levelled against the queen, who had taken a part in a pastoral performed at Somerset-house, he was prosecuted in the star-chamber, and sentenced to a fine of 5000*l.*; to be expelled the university of Oxford, and Lincoln's Inn; to be degraded and disabled to pursue the profession of the law; to stand twice in the pillory, losing an ear each time; and to remain a prisoner for life. This savage sentence, which may be taken as a sample of those cruel oppressions, that in a few years excited the people to overthrow the government which dealt in such barbarities, and brought the king himself to the block, was executed in all its rigour, chiefly at the instigation of Laud, who could never forgive Prynne's previous attacks on episcopacy, and who was steeled against every feeling of humanity. Prynne bore his sufferings like a man, supported by the consciousness of having acted in a good cause; and was so little daunted by the punishment inflicted upon him, that he continued in prison to send forth publications against prelacy. For one of these, entitled "News from Ipswich," he was again sentenced by the same court to be fined 5000*l.*, to lose the remainder of his ears in the pillory, and to be branded in both cheeks with the letters S.L., signifying "Schismatical Libeller." Such was the fate of an honest, though, perhaps, enthusiastical opposer of arbitrary power.

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The sentence was put in execution in 1637, and he was sent for his imprisonment first to Caernarvon castle, and afterwards to the isle of Jersey. His spirit was not to be subdued by suffering; there was that elasticity in his mind, which was equal to the force of every blow, and it almost instantly recovered from the pressure. He continued to write till the meeting of the parliament of 1640, when he was chosen representative for Newport, in Cornwall, and by order of the house of commons was released. He entered London, with many other sufferers in the same cause, in a sort of triumphal procession, and presented a petition to the commons for damages against his prosecutors. He now became distinguished by his speeches and writings as an opposer of episcopacy, and when the impeachment of Laud was undertaken, he was appointed the chief manager. After the parliament had become victorious in the civil wars, he was appointed one of the visitors to the university of Oxford, and displayed great zeal for the establishment of Presbyterianism, but to his honour be it spoken, he used all his influence to promote an accommodation with the king. It was in his speech, in behalf of his majesty, that he affirmed, that in all his own services and sufferings in the cause, he had neither received redress nor reward, but that he had continued, at his own expence, to maintain by his writings the justice of the parliament's proceedings, to the conviction of great numbers at home and abroad. It is well known, by those who are acquainted with the history of that period, in what manner the army interfered to prevent an agreement with the king, and for his interference in behalf of his majesty, Prynne was with other members excluded and imprisoned. He afterwards became a bitter enemy of Cromwell and his party, the instant he saw in them enemies to the public liberties of his country; on this account he was, in 1650, thrown into prison without any particular cause being alleged in the warrant. He appealed to Magna Charta, and was liberated, and in the following year imprisoned at Taunton and Pendennis. He was still the industrious and ardent writer in the cause of liberty, civil and religious, and published between the years 1655 and 1660, no fewer than forty-six tracts. In the year 1659 he resumed his place in the house of commons, and wearied out by the tyranny of the protectorate, he became one of the most eager for the restoration of Charles II., hoping, no doubt, that he might be bound by such rules of action, as should render him a patriotic monarch. In 1660 he sat in the *healing* parliament, as it was called, and was appointed to the office of chief keeper of the records in the Tower, for which he was undoubtedly well qualified. In the following year he printed a pamphlet on a bill then depending in parliament, which drew upon him the censure of the house of commons, and he was probably convinced of his error, for he submitted to ask pardon for the offence which he had done. His latter years he occupied in writings connected with his office in the Tower. He died in 1669. He was unquestionably a man of great learning, and the most indefatigable industry. It has been said he lived solely for the purposes of writing, and Wood supposes he must have written a sheet a day from his coming to man's estate till his death. His writings, however, were the effects of his public spirit and patriotism, and he lived, not to write, but to oppose tyranny wherever he found it, and writing was the instrument he made use of to effect his purposes. He was by his contemporaries, the moderate men of his time, as well as by the governments which he opposed, looked upon as a schismatic and libeller; but without such men, all that is excellent in our constitution would long since have been lost. Prynne,

therefore, merits the regards of posterity, and ought to be treated with the reverence to which every ardent friend of the liberties of the country has a claim. His works amounted to forty volumes folio or quarto. The most valuable are, his "Collection of Records," three vols. folio. His edition of "Sir Robert Cotton's Abridgment of the Tower Records;" and his "Observations on the fourth Part of Coke's Institutes." Biog. Brit. Hume.

PRYTANEUM, *πρυτανειον*, in *Antiquity*, a considerable building in Athens, where the council of prytanes assembled, and where those who had rendered any signal services to the commonwealth, were maintained at the public expence. See ATHIENS.

PRYTANIS, or PRYTANES, the first magistrate in most of the cities of Greece.

At Athens there were fifty prytanes, at Corinth there was but one, who was the same with what the archon was at Athens.

The prytanes of Athens were the senators who composed the grand council that governed the state; and correspond to what we now call *the states general of the United Provinces*.

Fifty of these were chosen each year out of each tribe; and to these were nominated fifty more, to supply the places of the former, in cases of death, or mal-administration.

The tribes took the government by turns, each after the other, for the space of thirty-five days. This was an establishment of Solon. Scaliger is mistaken, when he says the tribes took their turns every day.

All the fifty prytanes of the tribe did not govern together during those five weeks; but in companies, ten at a time, chosen by lot; seven days each company: after which another tribe came into office, and had its five weeks after the same manner.

PRYTANITIDES, a name given to those widows who at Athens, and throughout all Greece, had the sacred fire of Vesta committed to their care. The custom of the Greeks, in this respect, differed very much from that of the Romans; who allowed none but virgins to tend this sacred fire, whence they were called Vestals.

They had the appellation Prytanitides from *πρυτανειον*, a name common to all places sacred to Vesta.

PRZEDBORS, in *Geography*, a town of Poland, in the palatinate of Sandomirz; 20 miles N.N.W. of Malogocz.

PRZELAUTSCH, a town of Bohemia, in the circle of Chrudim, on the Elbe; 12 miles N.W. of Chrudim. N. lat. 49° 58'. E. long. 15° 30'.

PRZELOM, a town of Lithuania; 22 miles N.N.W. of Grodno.

PRZEMENTZ, a town of the duchy of Warfaw; 32 miles S.W. of Posen.

PRZEMILOV, a town of Bohemia, in the circle of Chrudim; 6 miles S. of Chrudim.

PRZEMISLAU, a town of Austrian Poland, in Galicia; 20 miles E.S.E. of Lemberg.

PRZEMYSL, a town of Poland, in Austrian Galicia, defended by a castle, the see of a Greek and Roman bishop; 4 miles W. of Lemberg. N. lat. 49° 36'. E. long. 22° 45'.

PRZEROL, a town of Lithuania; 8 miles W.S.W. of Troki.

PRZEROW. See PRERAU.

PRZESTITZ, a town of Bohemia, in the circle of Pilsen; 6 miles S. of Pilsen. N. lat. 49° 33'. E. long. 13° 26'.

PRZEWAL,

PRZEWAŁ, a town of Austrian Poland, in Galicia; 38 miles E. of Chelm.

PRZEZERSKE, a town of Prussia, in the province of Pomerelia; 9 miles N. of Culm.

PRZEZLAU, a town of Austrian Poland, in Galicia; 44 miles S.W. of Sandomirz.

PRZIBOR. See FREYBERG.

PRZIBRAM, a town of Bohemia, in the circle of Beraun; 17 miles S. of Beraun. N. lat. $49^{\circ} 42'$. E. long. $15^{\circ} 5'$.

PRZINDA. See FRAUENBURG.

PRZIPCOWIUS, SAMUEL, in *Biography*, an eminent Polish knight, was born about the year 1592. He was initiated in the elements of learning in his native country, and commenced his academical course of studies at the university of Altdorf. Here he probably embraced the Unitarian doctrine, which obliged him to retire to Holland, and he pursued his studies at the university of Leyden. When he was only eighteen years of age he published anonymously "Dissertatio de Pace et Concordia Ecclesiae," which was so ably written, as to be ascribed to the pen of Episcopus. Having spent some years at Leyden, in the cultivation of science and learning, he returned to Poland, where his talents recommended him to the notice and confidence of king Uladislaus Sigismund. He was appointed to fill different posts of honour and authority; rendering his name illustrious by his valour in the field, and his wisdom in the cabinet; by his persuasive eloquence and invincible fortitude, and at the same time he was eminent for his distinguished virtues. In his leisure moments he drew up a panegyric on Uladislaus Sigismund, king of Poland, in which he extolled that prince's clemency to the Dissidents, and pointed out the important advantages which the country derived from it. Under his administration, the followers of Socinus met with wonderful success in propagating their opinions, and establishing churches in the Polish territories. Their flourishing state induced Przypcovius to compose "A History of the Unitarian Churches in Poland," but the work was lost during the storm of persecution in which they were afterwards involved.

In 1648 he experienced a sad reverse of fortune, on the breaking out of the war with the Cossacks, who plundered and laid waste the country, particularly the districts bordering on the Borysthene or Dnieper, where the possessions of Przypcovius were chiefly situated. This was soon followed by the calamities in which the Unitarians partook, in common with the rest of their countrymen, during the civil wars which overspread Poland, in which the Austrians, Muscovites, and Swedes took part, as auxiliaries, with the contending factions. After peace was restored to the country, our author and his Unitarian brethren were harassed by the incessant persecutions of the popish party, till at length, in the year 1658, a general proscription was passed against them. By this act they were, for ever, banished from their country, being allowed a year in which they might dispose of their property. Means were, however, found to deprive them of the benefit of this pretended indulgence, and the greater part of them were entirely stripped of their honours and estates, in which number was Przypcovius. After he had become an exile from his country, the reputation of his virtues and learning procured him an asylum with the elector of Brandenburg, who gave him the honourable appointment of privy-counsellor. With the salary which he derived from this office he maintained some families of his fellow sufferers in his own house, cheerfully submitting to privations, that he might be able to afford more relief to his persecuted brethren, and making no provision for the widow of his

only son, and his two grand-children by her, but trusting that a kind Providence would raise them up protectors and friends. On account of his acquaintance with theological subjects, his skill and long experience in the management of business, and because his name was in great repute among foreigners, a synod of Unitarians, held in Silesia in 1663, devolved on him the office of maintaining a correspondence with their brethren in other nations, with a view of promoting the interests and increase of the whole community. He died in 1670, at the age of 78. Besides the pieces already noticed, Przypcovius was author of "Cogitationes sacrae ad initium Matthæi et Epistolas Apostolicas:" "Vita Fausti Socini Senensis:" "Demonstratio quod neque Pater Domini nostri Jesu Christi per Metaphorem Pater, neque Filius ejus unigenitus per eandem Metaphorem Filius, dici queat aut debeat," with other pieces. It may be right to mention here that the collection entitled "Bibliotheca Fratrum Polonorum," is not complete without the works of Przypcovius.

PRZITICK, in *Geography*, a town of Poland, in the palatinate of Sandomirz; 16 miles N.W. of Radom.

PRZLARG, a town of Prussia, in Oberland; seven miles W.S.W. of Soldau.

PRZYPIECKZ, or PRYPIEC, a river that rises on the borders of Austrian Poland, and after crossing Russian Lithuania from W. to E., runs into the Dnieper, about forty miles above Kiev.

PSADURIA, in *Mineralogy*, a genus of rough stones of a plain uniform structure, not laminated, but splitting equally in all directions.

PSAGDA. See SAGDA.

PSALM, ψαλμῶν, formed from ψαλλω, *I sing*, a divine song or hymn.

The denomination psalm is now appropriated to the one hundred and fifty psalms of David; and the name canticle, or song, is given to other pieces of the same kind, composed by other prophets and patriarchs.

The ancients, as is observed by St. Augustine, made this difference between a canticle, or song, and a psalm, that the former was sung by the voice alone, but the latter accompanied with a musical instrument.

The psalms, in the ancient editions, are divided into five books; nor is David's name found at the head of more than seventy-three of them; though some, and among the rest St. Augustine and St. Chrysostom, attribute all the hundred and fifty to him without exception.

The Jews, however, were always of another opinion; and it is certain there are some few, at least, that are not his. St. Jerome observed, among the number, several that were composed a long time after David. Dupin adds, that it is difficult to ascertain the authors; all we know of the book is, that it is a collection of songs compiled by Ezra.

Gradual psalms were those anciently sung on the steps of the temple. The *penitential* psalms were not formerly the same with those now called by that name.

The psalms of David exhibit to every reader the most plain and distinguishing marks of poetical writing; the peculiar character of which has been described under the articles PARALLELISM, HEBREW Poetry, and PROPHEPIC Poetry. The book of psalms contains specimens of the various kinds of poetical composition. To the didactic, we may refer the 119th, the other alphabetical psalms, and some few others; about a seventh part of this book consists of elegies, composed on occasions of distress and mourning; the 42d psalm, in particular, is in the highest degree tender and plaintive: and the reader of it in the original, who adverts to the division of the periods, and the resolution of them

them into their constituent parts or members, will find that the periods spontaneously divide into verses of nearly equal length and measure, exactly similar to those of the four first chapters of the Lamentations of Jeremiah, which constitute the established metre of the Hebrew elegy. (See LAMENTATIONS.) The whole of the 19th psalm consists also of the same kind of verse, except the epode, which contains two long verses of the same kind, and one shorter, which last is once repeated. The 43d psalm, too, seems to be constructed upon similar principles, containing eight of the same kind of verses, with the same epode, and since it is written in the same train of sentiment, the same style, and even apparently in the same metre, it ought not perhaps to be separated from the preceding psalm, but to be considered as a part or continuation of the same composition; and if this be true, the whole poem consists of three parts, almost equal and alike, each of which is concluded by the same intercalary period or stanza. For another most beautiful poem of the elegiac kind we refer to the lamentation of David for Saul and Jonathan; 2 Sam. i. 17—27. Moreover, the whole book of psalms may be considered as a collection of sacred odes; in which we find the ode exhibited in all the varieties of its form, and supported with the highest spirit of lyric poetry; sometimes sprightly, cheerful, and triumphant; sometimes solemn and magnificent; sometimes tender and soft. As the compositions of David are of the lyric kind, there is a greater variety of style and manner in his works than in those of Job and Isaiah. The manner in which David, considered merely as a poet, excels, is the pleasing, the soft, and the tender. In his psalms, there are many lofty and sublime passages; but in strength of description he yields to Job; in sublimity, to Isaiah. It is a sort of temperate grandeur, for which David is chiefly distinguished; and to this he always soon returns, when, upon some occasions, he rises above it. The psalms, in which he touches us most, are those in which he describes the happiness of the righteous, or the goodness of God; expresses the tender breathings of a devout mind, or sends up moving and affectionate supplications to heaven. For other specimens, we refer to the article ODE. For other psalms referred to the class of Idyllions, see IDYLLION. Blair's Lectures, vol. iii. Lowth's Lectures on Heb. Poet. by Gregory, vol. ii.

PSALMANAZAR, GEORGE, in *Biography*, a literary impostor who assumed that name, was probably a native of the south of France, though he never made known either his country or family. He was supposed to be born about 1680, and educated partly at a Franciscan seminary, then at a Jesuits college, and at last at a university. He seemed to have had an uncommon facility in the attainment of languages, but was not sufficiently steady to render himself tolerably perfect in any. At an early age he left the college, in order to support himself by private tuition. But this was not at all agreeable to his disposition, and he went to Avignon, where he pretended to have left his father's house on account of ill usage through his attachment to the Roman Catholic religion. He next assumed the character of a young Irish student of theology, who had left his country for the sake of religion, and was going on a pilgrimage to Rome; and having obtained a certificate, and equipped himself with a suitable garb, he set out on his rambles. After passing through several scenes he enlisted for a soldier, and became acquainted with one Innes, chaplain to a Scotch regiment. This man soon discovered Psalmanazar to be an impostor, but instead of exposing him, immediately conceived a plan of more extensive fraud, by which he himself might reap some profit. He

engaged the young man to act the part of a convert from heathenism, and having written a letter to Dr. Compton, bishop of London, with a flattering account of his pupil, he baptized him in a public manner, procured his discharge, and in consequence of the bishop's invitation, proceeded with him to London. The learned prelate listened to his story, while he endeavoured to pass for a native of the island of Formosa, of which little was known to Europeans. Innes set him about translating the church catechism into a pretended Formosan language, which he had framed, and he next employed him in writing a "History of Formosa." Though he had no other materials than what his own invention would furnish, aided by the account of Formosa by Varenus, he drew up such a work as excited the curiosity of the public, and was regarded, at that time, as containing genuine information; though in fact, when examined with a careful and scrutinizing eye, it was found full of inconsistencies and improbabilities. A second edition was preparing, when the bishop of London sent Psalmanazar to Oxford to pursue his studies in that seminary. He remained there six months, and then returned to London, but either his patrons distrusted him, or failed to put him in any suitable way of living, for in a few years he sold his name to a manufacturer of a kind of white porcelain, which was to pass as a secret communicated by Psalmanazar, and was advertised by the name of the "curious white Formosan work." He next endeavoured to get some money as a medical empiric, and as a teacher of languages and fortification; but these resources were inadequate to his wants, and he became clerk to a regiment of dragoons, which marched to the north in the year 1715, and in that character he visited many parts of the kingdom. Without following him through all the changes of this part of his life, it may be observed that he acknowledges himself to have been dissolute, unprincipled, and void of any fixed purpose. At length he obtained some steady employment as a translator, and it is said, that Law's Serious Call, with other devotional works falling into his hands, he was awakened to a sense of his past misconduct, and formed resolutions of amendment. He entered deeply into the study of the scriptures, and of the Hebrew language, in which he soon acquired such a proficiency that he composed a dramatic piece in Hebrew verse, entitled "David and Michael." His reputation for learning caused him to be engaged as one of the writers in the Universal History, which was his principal literary labour, and employed much of his time. The history of the Jews, of the Celtes, and Scythians, of the Greeks at the early periods, the ancient Spaniards, Gauls, and Germans, were the chief parts which he contributed to this voluminous work. It does not appear when he dropt the imposture of being a Formosan convert; but in his last will, dated 1752, there is an explicit and penitential confession of his criminality in adopting that fraud, and supporting it by his pretended account of the island. After his death, in 1763, his life, written by himself, was published, from which farther information may be obtained. See *Memoirs of the Life of* * * * * commonly known by the name of George Psalmanazar.

PSALMIST, in the *Church of Rome*, one of the lesser ecclesiastical orders, the same with what among us is called *clerk, precentor, or singer*.

PSALMODIER, *Fr.*, is, in the Romish church, reciting the psalms in a particular manner, between singing and speaking; it is singing or chanting, because the voice is sustained in musical tones; it is speaking, because the words are almost always uttered in the same tone.

PSALMODY,

PSALMODY, *ψαλμοδία*, the art of singing psalms.

PSALMODY, *Metrical*. The metrical psalmody, which John Hufs, Jerom of Prague, the Bohemian Brethren, and Martin Luther, published in the German language for the use of the common people, that priests might not be wanted, was soon imitated in other countries. The celebrated poet, Clement Marot, in France, having, about the year 1540, versified and dedicated to Francis I. about thirty of the psalms, from a prose translation by the famous Hebrew professor Vatable, they soon acquired such favour at court, as to be sung, in spite of the censures of the Sorbonne, by the king, queen, and chief personages of the kingdom, to the tunes of the most favourite songs of the times. Marot, who had long been suspected by the Catholics of heresy, and once thrown into prison for his religious opinions, fearing new persecution, flew to Geneva, where he put into French verse twenty more of the psalms. These, with the thirty that had been published at Paris, were printed at Geneva in 1543, with a preface by Calvin himself, but without music. Marot dying the next year, Theodore Beza versified the rest of the psalms in the same manner, and the whole hundred and fifty were published at Strasburg in 1545. Bayle says, that during the whole sixteenth century there was no French poetry, that approached the salt and natural grace of that with which Marot furnished it. And Menage says, that the French owe the *rondeau*, the *madrigal*, and modern form of the *sonnet*, to this poet, who first confined himself to the mixture of masculine and feminine rhymes, though he did not always strictly adhere to their alternate use, as a law. The sale of his fifty psalms was so rapid, that they could not be printed fast enough to supply the public demand for them; more than ten thousand copies having been sold in a very short time. When those of Beza were added to them, their favour still continued, and they were sung not only by the Lutherans and Calvinists, but the Roman Catholics. As yet, indeed, they had never been used in the conventicles of the sectarists, but in private, merely as moral and spiritual songs, to secular tunes, such as were easy to learn, and play on viols, and other instruments.

It was not till the year 1553, when these psalms appeared in the same book as the catechism of Calvin, and the Genevan Liturgy, that the Catholics took the alarm, and prohibited the further publication and use of them. After which, to sing a psalm in France was a declaration of heretical principles, and Psalmist became another name for Reformer, Huguenot, and Calvinist. Indeed, the purposes to which this lamentable music was often applied, during the struggles and growth of Calvinism, seems to have been worse than the music itself, as, according to writers of the opposite party, it was made the signal of tumult, sedition, sacrilege, and rebellion.

The chronology of Calvinistical psalmody seems to be this: Zwinglius, the chief of the Protestants in Switzerland, before the arrival of Calvin at Geneva, had introduced among them the same kind of metrical psalmody as John Hufs and the Bohemian brethren had recommended to their followers in Germany; and this seems to have been continued till the year 1543, when the psalms of Clement Marot, with a preface by Calvin himself, were first published at Geneva, with the single melodies of Guillaume Franc, an obscure musician, if such he may be called, whose name has never had admission in any catalogue of books, or been prefixed to any musical publication, that we have been able to discover.

Among the most celebrated composers of music to Calvinistical psalms, and spiritual songs, must be ranked Claude

Goudimel, a musician of Franche-Compté, who seems to have lost his life at Lyons on the day of the massacre of Paris. See GOUDIMEL, and CLAUDE LE JEUNE, of whose psalms we have three different editions of the music, in three different forms, and in different countries: for though, according to Bayle, they have never been sung in the church of Geneva, yet, in Holland, and in France, before the revocation of the edict of Nantes, as they were universally sung in Calvinistical churches and conventicles, except at Geneva, they went through more editions perhaps than any musical work since the invention of printing.

Claude le Jeune was doubtless a great master of harmony. The manner in which he first set twelve of the psalms of Clement Marot's French translation, in four and five parts, that were dedicated to the duke de Bouillon in 1598, at that time head of the French Huguenots, very much resembled the style in which our old masters used to write upon a plain song; as one of the parts is continually singing an ancient melody, or well-known psalm-tune, while the rest are descanting, or singing in florid counterpoint. In some of these there is great merit of composition in the ingenuity and contrivance of the several parts. See CLAUDE LE JEUNE.

The establishing metrical psalmody in England, was the consequence of the reformation, and our communication with foreign Protestants.

Several of the psalms were translated into English metre during the latter end of the reign of Henry VIII. by sir Thomas Wyatt, and printed in 1549. The earl of Surrey wrote a sonnet in their praise, and translated others himself; but both his version and that of Wyatt are lost. Indeed almost all our poets, good and bad, have attempted to translate, or rather versify, the psalms; but for want of success in this, as well as in writing original hymns, or sacred songs, Dr. Johnson has admirably accounted in his *Life of Waller*.

The first edition of Sternhold's fifty-one psalms, was likewise printed in 1549, and the second in 1553, but both impressions without musical notes; and in all probability, those that were not in possession of the tunes used by the German Protestants, applied to them such ballad airs as would best suit the metre; as had been done in France, when the version of Clement Marot was in favour at the court of Francis I. Sternhold lived to write a dedication, for the first edition of his psalms, to king Edward VI. following in this the example of Marot, who had dedicated his first thirty psalms to the king of France.

The entire version of the psalms, however, was not published till 1562, when it was tacked for the first time to the Common Prayer, under the following title: "The whole Booke of Psalmes collected into English metre by T. Sternhold, J. Hopkins, and others, conferred with the *Ebrue*, with apt notes to sing them withal." Imprinted by John Day.

There was no base or other part, but the mere tunes, in this edition; which tunes are chiefly German, and still used on the continent by Lutherans and Calvinists, as appears by collation: particularly the melodies set to the 12th, 14th, 113th, 124th, 127th, and 134th psalms.

PSALMODY *Island*. The Roman Catholics, in the first ages of Christianity, had their paroxysms of psalm-singing as well as the Protestants. St. Ambrose is not only said by St. Augustine to have brought from Greece the manner of singing the hymns, and chanting the psalms, which he established at Milan, and which was afterwards called the *Ambrosian chant*, but Eusebius tells us, that a regular choir and method of singing the service were first established,

and hymns used in the church, at Antioch, the capital of Syria, during the time of Constantine; and that St. Ambrose, who had long resided there, had his melodies thence. An order of monks was established there at a very early period of the Christian era, whose discipline obliged them to preserve in their monastery a perpetual psalmody, equally perennial with the vestal fire, or perpetual lamps of antiquity. Psalmody island, in the diocese of Nismes, had its name from a monastery founded by Corbilla, a Syrian monk of this order, about the end of the fourth century. This kind of psalmody is known in the monkish writers by the name of *laus perennis*; Gregory de Tours calls it *psalterium perpetuum*.

PSALMODY, *Parochial*. Singing of this kind among the reformers and schismatics, seems in all ages of our religion to have been the favourite mode of addressing the Divinity: for not only the Arians practised it in their processions, but the Albigenses, who may be called the first Protestant martyrs; and who, according to ecclesiastical writers, when Simon Montford, their persecutor, in 1210, had lighted a pile of wood for their destruction, precipitated themselves in the flames, to the number of a hundred and forty, singing psalms.

The disciples of Wickliffe, in England, during the fourteenth century, and those of John Hufs and Jerom of Prague, in the fifteenth, were psalm-fingers; and the hymn-book of the Picards, and Bohemian brethren, printed with musical notes at Ulm, 1538, shews that the melodies used by these sects, originated from the chants to which the ancient Latin hymns of the Romish church were sung. For in this book there are translations and imitations in German metre of most of the hymns and proses still used in the Romish church: such as the "Stabat Mater dolorosa;" "Te Deum laudamus;" "O lux beata Trinitas;" "Pange lingua gloriosi," &c. Some of these melodies, indeed, are in triple time, which never is the case in canto fermo, or cathedral psalmody. But "Stabat Mater," and "O lux," in this book, are set to old Romish chants, and "Te Deum" to the same that is inserted in the preface of Meibomius to the ancient Greek musical writers, as the most ancient melody which the church has preserved.

Among the first reformers who interested themselves about the manner of performing the psalms, we have not only Wickliffe, Hufs, Jerom of Prague, and Zuingle, but Luther, Cranmer, Calvin, Beza, Buchanan, and John Knox; who, though each of them had different ideas on the subject of sacred music, yet they agreed in stripping it of all the energy and embellishments of measure and melody, as indeed the Calvinists did likewise of harmony. Nor were the original institutes of psalmody more favourable to poetry than music; for by giving to each syllable, whether long or short, a note of the same length, all prosody, rhythm, and numerical cadence, are destroyed. And however beautiful the poetical measures may be to read, when sung in this drawling and isochronous manner, they not only afford the ear no pleasure, but become unintelligible.

That metrical psalmody, in slow notes of equal length, had its origin in Germany, and was brought thence by reformers to other parts of Europe, is demonstrable: for the 28th psalm, "Beati omnes quitiment Dominum," had been translated into German verse, in order to be sung in this manner, by John Hufs, in the beginning of the fifteenth century; which translation was afterwards modernized in the same measure, and to the same tune by Luther. And the same melody, which we sing to the 100th psalm, is not only given to the 134th in all the Lutheran psalm-books, but by Goudimel and Claude le Jeune, in those of the

Calvinists; which nearly amounts to a proof that this favourite melody was not produced in England. It is said to have been the opinion of Handel, that Luther himself was its author; but of this we have been able to procure no authentic proof. Tradition, however, gives to this celebrated heresiarch, as he is called by the Roman Catholics, several of the ancient melodies, which are still used in Germany.

PSALTER, *ψαλτηριον*, the book or collection of psalms, ascribed to David. See PSALM.

There is a multitude of editions of the psalter. Augustine Justinian, a Dominican and bishop of Nebo, published a Polyglot psalter at Genoa, 1516. And Contarinus published the psalter in Hebrew, Greek, Chaldee, and Arabic, with Latin notes and glosses.

PSALTER is also used among religious for a large chaplet or rosary, consisting of one hundred and fifty beads; the number of the psalms in the psalter.

St. Dominic is said to have been the inventor of this psalter.

PSALTERIUM, in *Anatomy*, or corpus psaloides; a part of the brain, between the two posterior crura of the fornix. See BRAIN.

PSALTERY, PSALTERION, also denotes a musical instrument much in use among the ancient Hebrews, who called it *nebel*.

We know but little of the precise form of the ancient psaltery. Kircher has taken pains to prove, that it was of a square form; and from an old book in the Vatican library he has exhibited a figure of it.

That now in use is a flat instrument; in form of a trapezium, or a triangle truncated at top.

It is strung with thirteen wire cords, set to unison or octave, and mounted on two bridges on the two sides. It is struck with a plectrum, or little iron rod, or sometimes with a crooked stick, whence it is usually ranked among the instruments of percussion.

Its chest, or body, is like that of a spinet. It has its name à *psallendo*; some call it *nablum*, or *nablum*.

Papius also gives the name psaltery to a kind of flute, used in churches to accompany the singing; called in Latin *sambucus*.

PSAMMISMUS, *ψαμμισμος*, formed from *ψαμμος*, *sand*, in *Medicine*, a term sometimes used for a bath of dry and warm sand, to set the feet of dropical persons upon.

PSAMMITICUS, in *Biography*, a king of Egypt, was the son of Ecus, who was put to death by Sabbaco on the conquest of Egypt. He avoided his father's fate by flying into Syria; and after the death of king Sethon, was one of the twelve lords who assumed the government of the country, and divided it between them. His part was the sea-coast, which being the least valuable, he was induced to cultivate commerce with the Phœnicians, Greeks, and other nations, by which he acquired wealth and foreign connections. His prosperity excited the envy of his colleagues, who made war upon him, but by the assistance of foreign mercenaries or allies, he proved superior to, and finally subdued them, and then made himself sole monarch of Egypt. This event is dated B. C. 670. He rewarded his allies with lands upon the Nile, and from this era a Grecian colony subsisted in Egypt, which maintained an intercourse with their countrymen, and rendered the transactions of that kingdom a part of genuine history. Psammiticus carried on war in Syria, where he besieged the city of Azotus, which resisted his arms for the space of twenty-nine years. The preference which he gave to foreign soldiers caused a defection of a great body of his own subjects, who marched away to the confines of Ethiopia, where

where they formed a settlement. To repair this loss, he attended still more assiduously to the advancement of commerce, and opened his ports to all strangers. He also renewed his alliances with the Athenians and other Greeks. After a long and prosperous reign of 54 years Psammiticus died, and was interred in the temple of Bubastis at Sais. He was founder of several magnificent edifices, and is said to have introduced the culture of the vine in Egypt, and to have sent an expedition for discovering the sources of the Nile. Univer. Hist.

PSATYRIANS, PSATYRIANI, in *Ecclesiastical History*, a sect of Arians, who, in the council of Antioch, held in the year 360, maintained that the Son was not like the Father, as to will; that he was taken from nothing, or made of nothing; and that in God, generation was not to be distinguished from creation.

PSEDDERSHEIM, in *Geography*, a town of France, in the department of Mont Tonnerre, and chief place of a canton, in the district of Spire. The place contains 1238, and the canton 13,066 inhabitants, in 24 communes.

PSEGMA, a name given by some of the ancients to the flos æris, or flowers of brass.

PSELAPHIA, a word used by the ancient medical writers to express friction with the hands, in cases where the distempered parts require it. This was always esteemed a part of the business of a physician, and was done with his own hand.

PSELLISMUS, in *Medicine*, from $\psi\epsilon\lambda\lambda\iota\zeta\omega$, *I stammer*, comprehends not only that species of faulty articulation which is commonly called *stammering*, but every other defect in the pronunciation of words. Dr. Cullen has enumerated seven species of psellismus, and Sauvages a still greater number. Those of the former are, 1. Psellismus hæsitans, when there is a difficulty in pronouncing the first syllable or word; the *battarismus* and *ischonophonia* of authors. 2. Psellismus ringens, in which the letter R is erroneously pronounced, being always aspirated, and as it were doubled; the *rottacismus* and *blasitas* of authors. 3. Psellismus lallans, or *lamdacismus*, when the letter L is improperly sounded, or used in the place of R. 4. Psellismus emolliens, when the harder letters are pronounced too soft, and the letter S is too much used; the *traulotes* of authors. 5. Psellismus balbutiens, when, in consequence of a large or tumid tongue, the labial letters are too much heard, and are often sounded instead of others. 6. Psellismus acheilos, when the labial letters are sounded with difficulty, or cannot be pronounced at all; the *P. mogilalia* of Sauvages. 7. Psellismus lagostomatium, when, from a division in the palate, the guttural letters are not well pronounced; the *cotacismus* of authors. None of these species of psellismus is ever the object of medical practice; pronouncing carefully, under the direction of a nice ear, affords the only means of relief. See Cullen, *Nosol. Method. gen.* 113.

PSELLUS, MICHAEL, in *Biography*, a Greek writer, was preceptor to Michael, the son of the emperor Constantine Ducas. He was a very voluminous author in a variety of branches, theological, mathematical, legal, medical, political, &c. His works are frequently quoted by the Byzantine writers, and Anna Comnena has given a handsome encomium of him. He occupied an honourable station under Michael, his pupil, on whose dethronement by Nicephorus Botoniates, in 1078, he was stripped of his property, and sent to a monastery, where he died in the same year. Among his printed works are, "Compendium quatuor Artium, de quatuor Mathematicis Scientiis;" "De Sanctissima Trinitate, &c.;" "Dialogus de Energia et Operatione Dæmonum;" "Synopsis Legum versibus Græcis."

PSEN, $\Psi\eta$, the name given by naturalists to the fig-gnat, a small species of gnat bred in figs while growing on the tree, and always remaining on the leaves of the same tree, and feeding on its juices. See CAPRIFICATION.

PSENITZA, in *Geography*, a town of Bosnia; 12 miles S. of Scrajo.

PSEPHISMA, $\Psi\eta\phi\iota\sigma\mu\alpha$, among the Athenians, a decree of the senate; the same with probuleuma.

PSEPHOMANTIA, $\Psi\eta\phi\omicron\mu\alpha\tau\iota\alpha$, in *Antiquity*, a species of divination, the same with cleromancy.

PSEPHOPHORIA, the art of using the *psèphi*, $\Psi\eta\phi\omicron\iota$, or counters. This was the first arithmetic taught children of every condition. Capitolinus, in his life of Pertinax, says, "Puer literis, elementariis & calculo imbutus."

PSEPHOS, $\Psi\eta\phi\omicron$, a name given to several things, as small stones, shells, and beans, used among the Greeks in giving their suffrages, and in their computations. Their origin is, by Mr. Mahudel, ascribed to the sons of Noah, who used this kind of calculation to assist their memory in numbering their flocks. Josephus assures us, that the Egyptians borrowed this method of counting from Abraham; and Herodotus relates, that these small stones were used both by the Egyptians and Greeks, only with this difference, that the latter placed them and cyphers from left to right, and the former from right to left. The art of using them in calculations was called *psèphophoria*.

Psephi were in use too among the Romans, who called them *calculi*. Whatever materials they consisted of, they were all of the same colour when used in calculations; whereas those used in giving suffrages were partly black and partly white. Lucky days were denoted by white, and unlucky by black ones. See CALCULUS.

PSETA, in *Ichthyology*, a name given by Athenæus to the fish we call the plaice, the *passer lævis* and *plateffa* of authors. See PLEURONECTES *Plateffa*.

PSETITES, in *Natural History*, a name given by authors to a stone, having in it the figure of a turbot. There are stones found in some parts of Germany having the impressions of several kinds of fish as perfect as if drawn by a pencil, and it is not to be doubted, but that they in reality owe them to the fish themselves; which were received into beds of the matter of stone, yet unhardened, which taking its consistence while they were in it, must crush them, and retain the marks of their bodies. They are usually found in a whitish slaty stone.

PSEUDO, a term or particle, used in the composition of divers Latin and English words; in the sense of *false* or *spurious*.

The word is formed from $\psi\epsilon\upsilon\delta\omicron\varsigma$, *lie, falsehood*, of $\psi\epsilon\upsilon\delta\omega$, *I deceive*.

We say a pseudo-martyr, *q. d.* a false witness, pseudo-prophet, pseudo-apostle, pseudo-christ, &c.

PSEUDO-ACACIA, in *Botany*. See ROBINIA.

PSEUDO-ACORUS. See IRIS.

PSEUDO-APIOS, a name given by some authors to the roots of bulbocastanum, or earth-nut.

The peasants in Burgundy, and other parts of France, turn up these in great quantities with the plough, and eat them. They call them *arnottas*, and some of the writers of the adjacent places not distinguishing what they truly were, have avoided the common name, by giving them this of pseudo-apis, formed of the name of a root to which they have no alliance, and taking away a name by which they would have been much better known; *arnotta* being only a corruption of the Dutch name *erfnote*, or earth-nut, a name by which they are called almost every where. See BUNIUM.

PSEUDO-ARGYRON, in *Mineralogy*, a word used by the ancients in two very different senses; some make it the name of what Virgil calls *orichalcum album*, white brass; and others of a mineral with which the common brass was made.

It is very evident, from the joint testimony of the old Greeks and Romans both, that they had in use a kind of white metal made of copper, and they esteemed it greatly above the yellow, or brass.

Aristotle tells us of this white metal, and gives it great encomiums; he says it was very white and very bright; and that it was made by melting copper together with a certain earth; but this he does not describe, so that we are left in the dark as to what it was.

This shining white metal might very naturally be called pseudo-argyron, or bastard silver.

PSEUDO-ASPHODELUS, in *Botany*. See **ANTHERICUM**.

PSEUDO-CAPSICUM. See **SOLANUM**.

PSEUDO-CARPASUM, a name given by some authors to the plant called by the generality of writers *libanotis*.

This is a plant of a very strong smell; and the *carpasum*, or *carpasum* of the ancients, being a poisonous gum, and the smell of the *libanotis* approaching to the same odour, occasion its being called the *bastard carpasum*.

PSEUDO-CYPERUS. See **CAREX**.

PSEUDO-DICTAMNUS. See **MARRUBIUM**.

PSEUDO-DIGITALIS. See **DRACOCEPHALUM**.

PSEUDO-DIPTERE, $\psi\epsilon\upsilon\delta\omicron\delta\iota\pi\tau\epsilon\rho\omicron\varsigma$, in the *Ancient Architecture*, a temple with eight columns in front, and a single row of columns all around.

The word signifies *false* or *imperfect* diptere; and is used to distinguish this from the diptere which had two rows of columns all around.

PSEUDO-FUMARIA, in *Botany*, a name used by some for a species of fumitory.

PSEUDO-GELSEMINUM, a name given by Rivinus to a genus of plants, the same with the *bigonia* of authors.

PSEUDO-IPECACUANHA, the name by which some authors have called a poisonous kind of American apocynum, the root of which something resembles the true ipecacuanha, and has sometimes been unfortunately collected and used in its place.

PSEUDO-LOTUS, a name by which some call the guaiacana of Tournefort. See *Indian Date PLUM*.

PSEUDONYMOUS, $\psi\epsilon\upsilon\delta\omega\nu\mu\omicron\varsigma$, formed from $\psi\epsilon\upsilon\delta\omicron\varsigma$, *lie*, and $\omega\nu\mu\omicron\varsigma$, *name*, a name given by the critics to those authors who publish books under false or feigned names. As the name *cryptonimus* is given to those who publish under secret and disguised names; and *anonymous*, to those who publish without any names at all.

The Apostolical Constitutions, the greater epistles of St. Ignatius, &c. are usually supposed to be *pseudonymous*.

PSEUDOPTERUS, in *Ichthyology*, a name given by Klein to the *SCORPÆNA Volitans*; which see.

PSEUDO-PULEX ARBOREUS, in *Entomology*, the name of a genus of insects described by M. Reaumur, and somewhat approaching in their form to the *pulex arboreus*; but having their wings covered with a squamose case, which those creatures have not, and having broader and flatter bodies. These principally live upon the fig-tree and the box; they pass through a sort of metamorphosis into a hopping fly, supposed by some of the nature of a grass-hopper; but erroneously, for that animal has a case for its wings, and the other not.

PSEUDO-STELLA, in *Astronomy*, any kind of meteor or phenomenon appearing in the heavens, and resembling a star.

PSEUDO-SYPHILIS, from $\psi\epsilon\upsilon\delta\eta\varsigma$, *false*, and *sypphilis*, the venereal disease, in *Surgery*, a name given to a variety of diseases which resemble lues venerea, but are in reality of a different nature.

Sores on the glans penis, prepuce, &c. in the form of chancres, as Mr. Hunter notices, may and do arise without any venereal infection, although in general they are a consequence of former venereal sores which have been cured.

The symptoms produced by the venereal poison in the constitution, are such as are common to many other diseases. For instance, as Mr. Hunter has ably explained, blotches on the skin are common to what is called a scorbutic habit; pains are common to rheumatism; swellings of the bones, periosteum, fasciæ, &c. to many bad habits, perhaps, of the scrofulous and rheumatic kind. Thus, says this valuable observer, most of the symptoms of the venereal disease, in all its forms, are to be found in many other diseases. Hence the original cause, and many leading circumstances, such as dates, effects of the disorder upon others, from connexion, when only local, the previous and present symptoms, &c. must be considered, before we can determine absolutely what the disease truly is. All the circumstances and symptoms, taken together, may be such as will attend no other disease. However, Mr. Hunter confesses, that, with all our knowledge, and with all the application of that knowledge to suspicious symptoms of this disease, we are often mistaken, calling distempers venereal which are not so, and sometimes supposing really syphilitic affections to be of another nature.

Mr. Hunter takes notice, that in some constitutions rheumatism, in many of its symptoms, resembles the lues venerea. The nocturnal pains, swelling of the tendons, ligaments, and periosteum, and pain in those swellings, are symptoms both of the rheumatism, and also the venereal disease, when it attacks those parts. Mr. Hunter, however, did not know that he ever saw the lues venerea attack the joints, though many rheumatic complaints of such parts are cured by mercury, and therefore supposed to be venereal.

Mercury, given without caution, often produces the same symptoms as rheumatism. Mr. Hunter has seen such complaints supposed to be venereal, and the medicine continued.

This interesting author also explains, that some diseases not only resemble the venereal in appearance, but, in the mode of contamination, proving themselves to be poisons, by affecting the part of contact; then producing immediate consequences similar to buboes; and also remote consequences similar to the lues venerea.

Mr. Hunter observes, that it is nearly as dangerous, in some constitutions, to give mercury, when the disease is not venereal, as to omit it in other cases which are really syphilitic. Many of the constitutions which put on some of the venereal symptoms, when the disease is not really present, are those with which mercury seldom agrees, and commonly does harm. Mr. Hunter has seen mercury, which was exhibited for a supposed venereal ulcer of the tonsils, produce a mortification of those glands, and the patient was nearly destroyed.

PSEUDO-THECA, in *Entomology*, the name of a species of two-winged fly, approaching to the nature of a common wasp, but having no sting.

This is, according to the later distinctions in the history of insects, properly called a *wasp-fly*. There are bee-flies, as much resembling the bees as this does the wasp.

PSEUDO-TINEA, the name of a very remarkable species of insect described by M. Reaumur, approaching to the nature of the tinea, or cloth-moth, while in the worm-state; but not making themselves coats of the substance of leaves, cloth, &c. though they form a sort of cases for their defence against a very terrible enemy.

These creatures are truly of the caterpillar kind, and have in the manner of many of these insects, sixteen legs. They feed on wax, and for food enter the bee-hives; where they boldly engage the bees, and are not to be prevented by them from feeding, though at the expence of their habitations and the cells of their reservoirs of honey; so that it is no uncommon thing for a swarm of bees to be forced to change their place of habitation, and make new combs elsewhere; leaving the old ones to their contemptible victor, whom they know not how to drive out or dispossess.

Virgil and Aristotle, and all the authors who have written on bees, have complained of this destructive animal. It never eats the honey, but feeds only on the wax; attacking principally those waxy cells where the female bee deposits her eggs for the future progeny.

The bees, who are a match for most other creatures, by means of their stings, would easily destroy those weak creatures, were it not for the impervious armour they are covered with. They form themselves a coat of armour of a double matter; the first, which immediately covers the body, is a kind of silk of their own spinning; and the outer covering over this is of the bees-wax; this is laid considerably thick, and the creature just thrusting out its head to feed, goes on devouring the cells undisturbed, while a whole army of the inhabitants are in vain buzzing about him, and attempting to pierce him with their stings.

When the time of the change of this creature approaches, it contracts its body within its double covering, and there changes into the nymph state; whence, after a proper time, it comes forth in form of a moth, with granulated horns and crooked proboscis.

The bees have cunning enough to know their destructive enemy in this new form, and as this is a weak and defenceless state, they attack and destroy all the moths of this species they can meet with. They seldom are so fortunate, however, as to kill the whole race as soon as produced; and if only one escapes, it is able to lay a foundation of revenge for the death of its brethren.

The moth produced by this caterpillar flies but little, yet is very nimble in avoiding danger by running, which it does with great swiftness.

There are species of these pseudo-tineæ, or wax-eating caterpillars, which infest the subterranean hives of wasps, and other creatures which make wax: the manner of living, feeding, and defending themselves from their enemies, is the same in all the species.

The accurate author of these observations describes also a kind of pseudo-tineæ, which feed on wool, and another that eats leather; both making themselves houses also on the materials they feed on. All these creatures, whatever be their food or habitation, finally become phalænæ, or moths: and may be distinguished, even in this state, from the other species, by having granulated horns of a remarkable structure, and all of them a proboscis, or trunk, more or less incurvated.

PSEUDO-VIBURNUM, in *Botany*, the name given by Rivinus to a species of lantana.

PSIADIA, so named by Jacquin, from ψιξ, ψιξδος, a drop of dew, because of the glutinous exudation of its leaves, which often stands in drops upon their surface.—Jacq. Hort. Schonbr. v. 2. 13. Willd. Sp. Pl. v. 3. 2384.

Ait. Hort. Kew. v. 5. 180.—Class and order, *Syngenesia Polygamia-necessaria*. Nat. Ord. *Compositæ discoideæ*, Linn. *Corymbiferae*, Juss.

Gen. Ch. *Common calyx* imbricated, nearly ovate, of about ten lanceolate, bluntish, concave, unequal, erect scales, with a few smaller acute ones at their base. *Cor.* compound, radiated; florets of the disk numerous, male, tubular, funnel-shaped, with a five-cleft spreading border; those of the radius female, very numerous, in several rows, ligulate, scarcely longer than the others, each with one or two teeth. *Stam.* in the florets of the disk, filaments five, capillary, very short; anthers combined in a cylindrical tube. *Pist.* Germen only a rudiment in those florets, without style or stigma; in the others oblong; style thread-shaped; stigma divided, reflexed. *Peric.* none, except the scarcely altered calyx. *Seeds*, in the radius only, solitary, linear; down sessile, simple. *Recept.* flattish, naked, except where clothed in the centre with the firmly-fixed rudiments of germens of the male florets.

Ess. Ch. Receptacle naked. Down simple, sessile. Calyx imbricated, ovate. Florets of the radius scarcely longer than the rest, spreading.

1. Pl. *glutinosa*. Jacq. Hort. Schonbr. v. 2. 13. t. 152. (*Solidago viscosa*; Schrad. Sert. Hanov. 12. t. 6.)—Native of the island of Mauritius. It was sent to Kew by Baron Hake, from Gottingen, in 1796, and flowers there from June to August, requiring the protection of a green-house in winter. Few amateurs indeed would allow it a place there, the whole plant being far less ornamental than the meanest American *Solidago*. The stem is shrubby. Leaves alternate, stalked, ovate, acute, serrated, two or three inches long, dark green, very viscid. Flowers corymbose, terminal, small, pale yellow, without smell.

PSIDIUM, a name altered by Linnæus from ψιδίξ of the ancient Greeks.—Linn. Gen. 247. Schreb. 333. Willd. Sp. Pl. v. 2. 957. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 185. Aubl. Guian. v. 1. 482. Loureir. Cochinch. 309. Juss. 324. Lamarck Illustr. t. 416. (*Guajava*; Tournef. t. 413. Gært. t. 38. *Decaspermum*; Forst. Gen. t. 37. *Nelitris*; Gært. t. 27.)—Class and order, *Icosandria Monogynia*. Nat. Ord. *Hesperideæ*, Linn. *Myrti*, Juss.

Gen. Ch. *Cal.* Perianth superior, of one leaf, bell-shaped, permanent, cloven into five, ovate, rather deep segments. *Cor.* Petals five, ovate, concave, spreading, inserted into the calyx. *Stam.* Filaments numerous, shorter than the corolla, inserted into the calyx; anthers small. *Pist.* Germen inferior, roundish; style awl-shaped, very long; stigma simple. *Peric.* Berry ovate, very large, crowned with the calyx, of one or occasionally more cells. *Seeds* numerous, small, kidney-shaped, imbedded in pulp.

Ess. Ch. Calyx five-cleft, superior. Petals five. Berry with very numerous seeds.

Obs. This genus seems but ill distinguished from *Myrtus*.

1. *P. pyrifcrum*. White Guava. Linn. Sp. Pl. 672. *P. fruticosum*; Brown Jam. 238. (*Guajaba foliorum angulis quadrangulis, fructu oblongo*; Trew. Ehret. t. 43. Merian Surin. t. 19.)—Leaves elliptical, downy beneath. Stalks single-flowered.—Very common in Jamaica and others of the West Indian islands, also in Cochinchina and the southern provinces of China. It flowers at Kew in June and July. This handsome tree varies from about six to twelve feet in height; its trunk being about a foot and half in diameter. Bark yellowish-brown, with large ash-coloured dots. Leaves opposite, on short stalks, blunt, entire, smoothish. Flower-stalks solitary, short, each sup-

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porting a white, sweet smelling blossom. *Fruit* smooth, roundish, whitish or yellow on the outside. *Seeds* enveloped by a firm, flesh-coloured, sweet, aromatic pulp. The fruit of the White Guava is much esteemed both by the natives and Europeans either in its crude state, or when made into jellies. The *wood* is very tough, frequently used for bows and yokes.

2. *P. pumilum*. Dwarf Guava. Willd. n. 2. Vahl. Symb. v. 2. 56. (Cujavillus; Rumph. Amboin. v. 1. 145. t. 49.)—Leaves lanceolate, acute, downy beneath. Stalks single-flowered.—Native of Ceylon. In habit and appearance this is exactly similar to the first species, but only a fifth of the size in all its parts, being a *shrub* about two feet high, whose *branches* are covered with a villous, ash-coloured bark. *Leaves* opposite, entire, smooth above, hairy beneath. *Fruit* the size of a hazel-nut, villous.

3. *P. aromaticum*. Aromatic Guava. Willd. n. 3. Aubl. Guian. 485. t. 191.—Leaves oblong, pointed, smooth. Stalks single-flowered.—Native of woods in Cayenne and Guiana, flowering in October and bearing fruit in February. This *tree* is about five feet in height, branched at the summit in a scattered manner. *Leaves* opposite, on short stalks, entire; when bruised smelling like Balm. *Flowers* white, occasionally with only four petals. *Berry* globular, like a cherry, yellow, esculent.

4. *P. grandiflorum*. Great-flowered Guava. Willd. n. 4. Aubl. Guian. 483. t. 190.—Leaves ovate, pointed, smooth. Stalks single-flowered, with bractæas.—Found in the woods of Cayenne, flowering and fruiting rather later than the last. The *trunk* of this is about ten feet high, branching irregularly from the summit. *Leaves* opposite, on short stalks. *Flowers* axillary, rather large and showy, white, fragrant. *Fruit* yellow, austere, not eatable.

5. *P. Decaspermum*. Linn. Suppl. 252. Willd. n. 5. (*Decaspermum fruticosum*; Forst. Gen. 37.)—Leaves ovate, pointed, downy. Stalks single-flowered, with bractæas.—Native of Otaheite, and the other Society Isles. This *shrub* is for the most part smooth. *Leaves* on stalks, small, entire, veined, not marked with lines. *Flowers* small, white, on short, silky stalks. *Fruit* small, globular, rugged. *Seeds* placed in a double row, oblong, convex on one side, compressed on the other. Jussieu well observes that the *seeds* of this plant being solitary, in each of the ten cells of the *berry*, the genus of Forster ought perhaps to be retained.

6. *P. pomiferum*. Red Guava. Linn. Sp. Pl. 672. (Malacka pela; Rheed. Hort. Malabar. v. 3. 33. t. 35.)—Leaves oblong-lanceolate, downy beneath. Stalks three-flowered.—Native of the West Indies, and introduced at Kew in 1692, where it flowers in June and July. The *stem* or *trunk* of this species is thick, about twenty feet high, much branched at its summit. *Leaves* on short stalks, with a strong midrib, and much veined, of a light green colour. *Flowers* showy, large, and white. *Fruit* resembling a pomegranate, having an agreeable fragrance.

Jacquin remarks that the Red Guava is nearly allied to the first species, but not so common, and scarcely ever eaten. In Martinico the first is called *Goyavier de Cayenne*; the latter *Goyavier du pays*. *P. pomiferum* of Loureiro appears to be a much smaller shrub, for he describes it as only four feet in height.

7. *P. guineense*. African Guava. Willd. n. 7. Swartz Prodr. 77. Ind. Occ. v. 2. 381.—Leaves ovate, entire, downy beneath. Stalks three-flowered.—Native of Prince's Island on the coast of Guinea, and cultivated in Hispaniola. A small *tree*, whose trunk is smooth and branched. *Leaves* opposite, stalked, elliptical, nerved, thick, coriaceous.

Flowers three together, the middle one sessile, the others on stalks, often deciduous. *Fruit* small, roundish, tawny without, of a deep red within, having a most grateful and exquisitely sweet taste.

8. *P. montanum*. Mountain Guava. Willd. n. 8. Swartz Prodr. 77. Ind. Occ. v. 2. 879. (*P. arboreum maximum, foliis ovatis nitidis, ligno fusco, fibris undulatis*; Brown Jam. 239.)—Leaves oblong, pointed, crenulated, shining. Stalks many-flowered.—Native of woods in Jamaica. This is one of the largest *trees* in the island, frequently reaching to sixty, seventy, or even a hundred feet, and of a proportionate thickness, covered with smooth, spreading *branches*. *Leaves* opposite, stalked, undulated at the margin. *Flowers* white, fragrant, resembling those of the White Guava. *Fruit* acid.—Brown tells us “it is an excellent timber-wood, of a dark colour and curled grain; works easily, and takes a fine polish. It makes very beautiful walking-sticks.”

9. *P. caninum*. Loureir. Cochinch. v. 1. 310.—Leaves slightly serrated, downy on both sides. Stalks many-flowered, axillary, and terminal.—Found in fields near Canton. This shrub is about two feet high, much branched, diffuse. *Leaves* alternate, on short stalks, veined. *Flowers* white, in smallish oblong clusters. Loureiro called this species *canina*, because “dogs frisk round it with the same delight as cats do about Valerian.” Willdenow suspects this not to be different from *P. pumilum*, n. 2.

10. *P. nigrum*. Loureir. Cochinch. v. 1. 311.—Leaves slightly serrated. Stalks terminal, branched.—Native of woods in Cochinchina. A middle-sized *tree*, with tortuous, spreading branches. *Leaves* ovato-lanceolate, dark-green, shining. *Flowers* white, on terminal stalks. *Fruit* small, round, black.

11. *P. rubrum*. Loureir. Cochinch. v. 1. 311.—Leaves oblong, entire. *Flowers* sessile, crowded together, axillary. Found with the last, being, like that, a *tree*, of a middling size, with spreading *branches*. *Leaves* obtuse, smooth. *Flowers* white, axillary. *Fruit* small, oblong, red, esculent, having a sharpish yet sweet flavour.

Loureiro properly retains this species in *Psidium*, although its *calyx* and *corolla* have only four instead of five parts.

PSIDIUM, in *Gardening*, contains plants of the exotic tree kind, of which the species cultivated are the white guava (*P. pyriferum*), and the red guava (*P. pomiferum*).

Method of Culture.—These plants are increased by seeds, which must be procured from the countries where they grow naturally; and when these are brought over in the entire fruit, gathered full ripe, they succeed with greater certainty. They should be sown in pots filled with rich kitchen-garden earth, plunging them into a hot-bed of tanners' bark, giving them water from time to time, as the earth dries. When the plants come up, they must have free air admitted to them, in proportion to the warmth of the season; and when they have attained strength enough to be removed, be each planted out in a small pot, filled with the same sort of earth, and be plunged into a fresh hot-bed, shading them from the sun until they have taken new root, when they should have a large share of free air admitted to them every day in warm weather, to prevent their drawing up weak: they must also be frequently refreshed with water in summer.

When they have filled these small pots with their roots, they should be shaken out, and their roots pared, putting them into larger pots, filled with the same sort of earth, and replunged into the hot-bed, where they should remain till autumn, when they must be plunged into the tan-bed

in the stove. During the winter, they should have moderate warmth, and not too much water; and in summer, have plenty of moisture, and in hot weather a great share of air.

They afford ornament among other stove-plants.

PSILOCITHARISTA, among the *Ancients*, one who plays on the cithara, without singing in concert to it.

PSILOTHRON, $\psi\iota\lambda\omega\theta\rho\omega\nu$, formed from $\psi\iota\lambda\omega\varsigma$, *deglabro*, I make bald, or bare, and $\theta\rho\iota\zeta$, hair, in *Medicine*, depilatory; an external form of medicine proper to take off the hair.

Such are the strong lixiviums, quick-lime, ants' eggs, sandarac, orpiment, and arsenic.

PSILOTUM, in *Botany*, received that name from Professor Swartz, in allusion to the slender, apparently leafless, habit of the original species, in which it differs from *Lycopodium*, though previously confounded with that genus under the appellation of *L. nudum*. The above word is derived from $\psi\iota\lambda\omega\varsigma$, slender and naked.—Swartz Syn. Fil. 187. Brown Prodr. Nov. Holl. v. 1. 164. Ait. Hort. Kew. v. 5. 495. (Bernhardia; Willd. Sp. Pl. v. 5. 56. Timeopteris; Bernh. in Schrad. Journ. for 1800. part 2. 131. Swartz Syn. Fil. 187. Billard. Nov. Holl. v. 2. 105. Willd. Sp. Pl. v. 5. 56.)—Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices exannulatae*.

Ess. Ch. Capsules of two or three cells, and two or three valves, coriaceous, opaque, with many seeds. *Brown*.

1. Pf. *triquetrum*. Triangular Naked-fern. Swartz n. 1. Brown n. 1. Ait. n. 1. (*Lycopodium nudum*; Linn. Sp. Pl. 1564. *Lycopodioides frutescens*, spicis laxis nudis; Dill. Musc. 468. t. 64. f. 4.)—Branches triangular in every part.—Native of the West Indies, the isles of Mauritius and Bourbon, and New South Wales.—*Stem* about a foot high, repeatedly forked, slender, spreading, triangular, smooth, green. *Leaves* minute, so as scarcely to be observed, acute, entire, scattered, sessile; the floral ones divided. Structure of the *flowers*, and mode of impregnation, not yet detected. *Capsules* numerous, sessile, solitary, at the division of each floral leaf, appearing reticulated under a magnifier, three-lobed, the size of a large pin's head.

2. Pf. *complanatum*. Flat Naked-fern. Swartz n. 2. t. 4. f. 5. (Bernhardia complanata; Willd. Sp. Pl. v. 5. 57.)—Branches two-edged, compressed.—Native of Jamaica, on the trunk and branches of trees. Like the foregoing in habit, but flat, and bearing much fewer capsules, situated at the very summits of the branches.

3. Pf. *truncatum*. Abrupt-leaved Naked-fern. Brown n. 2. (Timeopteris tannensis; Bernh. in Schrad. Journ. for 1800. part 2. 131. t. 2. f. 5. Billard. Nov. Holl. v. 2. 105. t. 252.)—Leaves dilated, abrupt, with a bristly point. Capsule of two cells.—Found by Forster in the island of Tanna. Mr. Brown and M. Labillardiere have observed it in various parts of New Holland. We have specimens from Port Jackson. This is a leafy fern, about a span high, unbranched. *Leaves* imperfectly two-ranked, alternate, somewhat stalked, oblong, oblique, abrupt, single-ribbed, smooth, about an inch long, each tipped with a small bristle; the floral ones divided to the very base. *Capsules* oblong, of two horizontally divaricated acute lobes.

Mr. Brown has made a very curious observation on the seeds of this genus; or at least on what are supposed such. These are oval bodies, appearing white in a mass, but semitransparent when separate, each exploding by a very minute orifice when put into water.

PSINIA, in *Geography*, a river of European Turkey, which runs into the Vardar, four miles S. of Krupulik.

PSITTACULA, in *Ornithology*, a species of *Alca*.

PSITTACUS, the Parrot, a genus of birds of the order Picæ, of which the generic character is, bill hooked; upper mandible moveable, and mostly covered with a cere; the nostrils are rounded, and placed in the base of the bill; the tongue is fleshy, obtuse, entire; feet formed for climbing.

This splendid and numerous genus is chiefly confined to the warmer regions of the ancient and new continent, or within the limits of the tropics; none being natives of Europe. Some few are found in latitudes far beyond what was supposed by Buffon, and even as far as 40° or 45° on each side of the equator. They are remarkable for their active and imitative disposition. From the peculiar form of their tongue, which, in most species, is thick, flattish, rounded, and fleshy, they are enabled to articulate with greater distinctness than other birds. The upper mandible is, as we have seen, moveable; and the feet formed for climbing, with a power of bringing forward at pleasure one of the hind toes. They are frugivorous and monogamous, depositing their eggs, which are generally two, sometimes three, in the holes of decayed trees. Though usually observed in pairs, they sometimes assemble in vast flocks. The whole genus, which, according to Gmelin, comprehends about 170 species, is divided into two sections, according to the shape of their tails.

A. Tail long, and wedge-shaped.

Species.

MACAO; Red and Blue Maccaw. Red; quill-feathers above blue, beneath rufous; feathers of the shoulders variegated blue and green; cheeks naked, wrinkled. This being by far the most magnificent of the whole parrot tribe, we shall give a pretty full description of it. It is a native of South America, where it resides chiefly in the palm woods, and feeds, like the rest of the birds of this genus, on various kinds of fruit. It has been more accurately described and figured by Edwards than by any other naturalist. He says, "it is undoubtedly the first of the parrot kind, if we consider either its magnitude, or the great variety and beauty of the colours with which its plumage is adorned. It is the biggest of all the kinds I have met with: when the tail is perfect, I have found some of them to measure more than three feet from bill-point to tail-end; the arch of the upper mandible, from the forehead to the point of the bill, is nearly three inches; the leg, from the knee downwards, is not an inch and half long; the longest toe, with the claw, is two inches and a half long; the upper mandible of the bill is whitish, except on each side next the head, where it is dusky; the lower mandible is black or dusky; it has no bare skin covering the bill; the nostrils are placed in the upper part of the bill, just within the feathers; the bill is great and strong; the tongue roundish and soft; the sides of the head, from the bill backwards, for a good broad space, are bare of feathers, and covered with a whitish, wrinkled, rough skin; in the upper parts of these spaces are placed the eyes, whose irids are yellow; the head, neck, breast, belly, thighs, upper part of the back, and lesser covert-feathers of the wings, are of a fine bright red or scarlet colour; the quill-feathers of the wings are of a very fine blue on their outsides, and a faint red on their under side; the first feathers next above the quills are of a fine yellow colour, some of the feathers being tipped with green; the blue quills which fall next the back are tinged with

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with green; the hinder part of the thigh has some green intermixed with the red; the lower part of the belly, and coverts under the tail, as also the lower part of the back, and coverts on the upper side of the tail, are of a very fine blue colour; the tail-feathers gradually shorten towards the sides; some of the longest or middle feathers are wholly red; the shorter or side feathers are partly red, and partly blue, their tips being blue, and their bottoms red; the legs and feet are covered with blackish or dusky scales; the toes are disposed two forwards and two backwards, as in other parrots; they are all armed with strong claws." This noble bird, says Dr. Shaw, at its first introduction into Europe, was considered as a present fit for royal personages, and was one of the principal ornaments in the halls of palaces. In a state of nature, these, of all the species of parrots, fly the best; and they always perch on the summits of trees, or on the highest branch. During the day they wander to the distance of two or three miles from their favourite spot, or home, but always return in the evening. They build in the holes of trees, which they enlarge when too narrow, and line the inside with feathers. They have two hatches annually, like all American parrots, and each consists of two eggs. The males and females sit alternately on the eggs, or cherish the young, and both equally carry the food: they never desert their charge so long as their assistance is required, and always perch near their nest. The young are said to be easily tamed; and in many parts of South America these birds are never taken but in the nest, the grown birds being educated with great difficulty. In a state of captivity, like many other birds, they are subject to epileptic fits, which, however, do not prevent them from arriving at a very considerable age, sometimes not less than thirty years.

ARACANGO; Red and yellow Maccaw. Pale scarlet; scapular feathers yellow, tipped with green; quill-feathers above blue, beneath rufous; cheeks naked, wrinkled. It inhabits Guiana, Brazil, and Jamaica, and is the size of the last. The tail-feathers above are scarlet, mixed with violet, beneath dusky red, two middle ones both sides dusky red on the upper half.

MILITARIS; Military Maccaw. Green; wings blue; front and tail red; cheeks mostly naked, with feathered lines. The bill is black; the rump and tips of the tail-feathers blue.

ARARAUNA; Blue and yellow Maccaw. Above blue, beneath yellow; cheeks naked, with feathered lines. There is a variety of this species, which has a long tail and naked cheeks. It is found in Jamaica, Guiana, Brazil, and Surinam. The tail of the female is yellow, that of the male red.

HYACINTHUS; Hyacinthine Maccaw. Violet blue; head and neck paler; chin and orbits yellow, naked.

MAKAWANNA; Parrot Maccaw. Above dusky green; head green mixed with blue; chin, throat, and upper part of the breast, reddish; lower part of the breast and belly green; rump red-brown. It inhabits Cayenne and Guiana; is eighteen inches long, and migrates.

ATER; Black Maccaw. Black, with a green tinge; bill and eyes red; legs yellow. It inhabits the interior parts of Guiana, on the sterile tops of rocks and dry mountains.

OBSCURUS; Obscure Parrot. Brown; cheeks red, naked; crown varied with blackish and ash; tail cinereous. It inhabits Africa, and is about the size of a magpie.

NOBILIS; Noble Parrot. Green; cheeks naked; shoulders scarlet. It inhabits Surinam, and is the size of a turtle-dove.

SEVERUS; Brazil green Maccaw. Green, cheeks naked; quill and tail-feathers blue, beneath purplish. A variety is

of a dusky green; with the front brown, and the crown greenish-blue. It is found in Jamaica, Guiana, and Brazil.

EUPATRIA; Gingi Parrot. Green; cheeks naked; shoulders scarlet; bill purplish. It inhabits Gingi in India.

JAPONICUS; Japanese Parrot. Green; beneath and lateral tail-feathers red; quill-feathers blue. It is found in the southern parts of Japan.

AMBOINENSIS; Amboina Parrot. Scarlet; back blue; wings with a green spot. It is about fifteen or sixteen inches long.

CYANOCEPHALUS; Blue-headed Parrot. Head green, chin blue. It is about a foot long, and inhabits India.

HÆMATOTUS; Red-breasted Parrot. Body above green; throat and breast orange; the feathers edged with blue, belly and tail green. There are three other varieties of this species, *viz.* 1. Breast red, varied with blue; head, chin, and middle of the belly, blue. 2. This resembles the last, except that the whole belly is blue. 3. Scapulars spotted with red and yellow. Found in New Holland and Amboina.

ATRICAPILLUS; Black-crowned Parrot. Above blue; chin, throat, and breast red; belly and vent green; crown black; collar green and red. It inhabits the Molucca isles, and is fourteen inches long.

TABUENSIS; Tabuan Parrot. Head, neck, breast, and belly, purple; back and wing-coverts green; crown terminated by a lunular blue mark; first quill-feathers and greater part of the tail blue. It inhabits the Friendly islands. There is a variety of this species, which is green, head, neck, breast, and belly scarlet; neck terminated by a lunular blue mark; wings green; rump blue; tail deep blue. This is found in New South Wales.

PAPUENSIS; Papuan Parrot. Head, neck, and breast red; hind head with a blue spot and two black crescents; wings and part of the back green; rest of the back, belly, and tip of the tail, red: three varieties are, 1. Belly crossed by a black stripe edged with green, breast purplish. 2. Scarlet; tail shorter, hinder part of the back blueish-black; a yellow spot between the wings. 3. Middle of the belly green. It inhabits Papua, and is sixteen inches long.

BORNEUS; Borneo Parrot. Red; quill and tail-feathers green at the tips; wings with a blue spot; orbits brown. It is an Indian parrot, and nine inches and a half long.

INDICUS; Indian Parrot. Scarlet varied with brown and violet; upper part of the head and neck, breast and stripe behind the eyes, violet; greater quill-feathers tipped with pale brown; lesser and tail-feathers violet brown. It is a native of Amboina, and nearly a foot in length.

ELEGANS; Beautiful Parrot. Head, neck, and body beneath red, above brown; interscapulars pale blue, mixed with red; tail greenish-brown, tipped with white. A variety has its wings, tail and body above green. It inhabits the Molucca islands: the first is about fifteen inches long, and the second twelve: in the former the bill is of a yellowish-brown; in the latter it is a lead-colour, and yellow at the tip.

GUEBIENSIS; Gueby Parrot. Bright red; quill-feathers black, with a transverse red band; tail brownish-red. It is about nine or ten inches long.

JANTHINUS; Violet Parrot. Head and body above brown, beneath violet; shoulders blue; tail and wings green and red. It is found near the river Amazons.

VARIEGATUS; Variegated Parrot. Scarlet; nape, beginning of the back, breast and belly, purple or blue; wings above

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above red, beneath yellow; tail green. It inhabits India, and is from ten to eleven inches long.

PENNANTII; Pennant's Parrot. Scarlet; fore part of the back black, waved with scarlet, sides and throat blue; quill-feathers each with a white spot. It is fifteen inches long, and inhabits New South Wales. There is a variety, having the middle of each wing with a pale band.

EXIMIUS; Nonpareil Parrot. Head, throat, breast, and vent crimson; back black, waved with yellow-green; wings and tail blue. It inhabits New Holland.

GLORIOSUS; Splendid Parrot. Bright blood-red; back-feathers edged with black; chin, wings, and tail blue. It is a native of New Holland, and is sixteen inches long.

NOVÆ GUINÆÆ; New Guinea Parrot. Black, with a bright blue tinge; tail beneath red; orbits naked, brown.

JAVANICUS; Javan Parrot. Scarlet; orbits naked, silvery; head crested, chin grey; throat and breast rosy; shoulders and wings mixed red and green; two middle tail-feathers scarlet, the rest rosy, mixed with green, tipped with blue. It is about the size of a lark, and is a native of Java.

JANDAYA; Yellow-headed Parrot. Above green, beneath yellow; head and neck yellow. It is a native of Brazil.

SOLSTITIALIS; Angola Parrot. Yellow; wing-coverts green; orbits red; lateral tail-feathers blue without. It inhabits Angola, and is nearly a foot long.

PALLIDUS; Pale Parrakeet. Yellow; wings whitish, slightly tinged, and a cast of greenish, according to the direction of the light. It inhabits Andalusia, and is about seven inches long.

GUAROUBA; Brazil Yellow Parrot. Yellow; greater quill-feathers green. It is found in Brazil, and is eleven inches long. There is a variety that is yellow; head reddish; neck orange; wings green. It inhabits New Spain.

CAROLINENSIS; Carolina Parrot. Green; head, neck, and knees yellow. It is a native of Guiana, and migrates into Carolina in the mulberry season; it is very destructive to orchards; builds in hollow trees in swampy places; does not easily learn to speak.

ALEXANDRI; Alexandrine Parrot. Green; collar and crest red; chin black. There are of this species the following varieties. 1. Collar rosy; hind-head violet; legs ash. 2. Collar purple, throat and breast pale rosy. 3. Collar double. 4. Head, chin, and tail blue. 5. Head mixed blue and yellow; temples black; throat and breast reddish; tail yellowish.

PERTINAX, Yellow-faced Parrakeet. Green; cheeks tawny; quill and tail-feathers rather hoary. This species is a native of America, and it migrates in flocks to the North: it feeds on seeds and fruits, and builds in large ant-hills, and is about thirteen inches long.

LEVERIANUS; Leverian Parrot. Pale green; head and neck yellow; quill-feathers, and tips of the tail-feathers, blue; rump crimson. It is found in the southern parts of Asia.

SMARAGDINUS; Emerald Parrot. Shining green; hind part of the belly, rump, and tail rusty chestnut. Inhabits near the Straits of Magellan, and is thirteen inches long.

CANICULARIS; Red-fronted Parrot. Green, with a red front; hind-head and outer quill-feathers blue; orbits tawny. It inhabits South America.

ÆRUGINOSUS; Brown-throated Parrakeet. Green, crown and first quill-feathers blue; orbits ash. It is a native of America, and is ten inches long.

RUFIROSTRIS; Red-billed Parrot. Green; bill and legs red; tail-feathers bluish at the tips; the orbits are of a flesh

colour. There is a variety whose bill, legs, and claws are whitish-red; the orbits are cinereous. It inhabits South America, is twelve inches long, and is easily taught to speak.

ORNATUS; Orange-billed Parrot. Yellow-green, hind-head, chin, and breast red; crown and auricles blue; orbits cinereous. This is a native of India.

JAQUILMA. Green; quill-feathers brown at the tip; orbits tawny. It inhabits Chili, lives in flocks, and feeds on buds of trees and plants; the flesh is very savoury.

GUIANENSIS; Pavouane Parrot. Green; cheeks spotted with red; the lesser wing-coverts are scarlet, the greater are yellow; quill-feathers beneath pale yellow, with a blackish margin towards the tip. It is found in Guiana and the Caribbee islands.

MARGINATUS; Varied-winged Parrot. Green; wing-coverts black; the lesser edged with yellowish-brown, the greater with blue. Found in Luzonia, as is the next.

SONNERATI; Blue-collared Parrot. Green; collar blue; spot on the origin of the wings red.

PONDICHERIANUS; Mustachio Parrakeet. Green; front and stripe from the mandible each side to the chin black; face white and blueish; breast purplish-blue; tail beneath straw-colour. A variety has its head from the base of the bill to the eyes chestnut; a brown line from the nostrils to the eyes; chin black, extending back like a beard; the nape is red. This species is found in Pondicherry.

ERYTHROCEPHALUS; Blossom-headed Parrakeet. Green; head red mixed with blue; chin black; collar black and pale green. There are three other varieties; 1. Crown and cheeks rosy; hind-head and two middle quill-feathers blue above, the rest blue at the edge. 2. Head, chin, throat, breast, and fore-part of the belly, peach-blossom colour. 3. Colour verging to yellow; area of the eyes and hind-head rosy. This species is a native of India.

BIMACULATUS; Spot-necked Parrot. Green, with two oblong black spots on the neck, and a large sulphur-coloured spot on each wing.

PLUMBEUS; Brown-fronted Parrakeet. Green; bill, legs, and orbits of a lead-colour; front, cheeks, and chin brown; edges and tips of the tail-feathers blue. This is nearly a foot long, and inhabits the tropical regions of America.

BUBALINUS; Buff-fronted Parrakeet. Green above, yellowish-green beneath; the front is buff. This is a native of Cayenne.

OLIVACEUS; Lace-winged Parrakeet. Olive; hind-head with a blueish spot; wings varying with blue, green, and orange. It is found in Luzonia, and is eleven inches long.

DUBIUS; Dubious Parrot. Green; neck reddish; orbits yellow, naked.

CHRYSOGASTER; Orange-bellied Parrot. Green, belly orange, bill greenish.

VIRESCENS; Yellow-winged Parrakeet. Greenish; lesser wing-coverts at the base, and within, white; without, and at the tip, yellow: the first seven quill-feathers within black, edged with white; the next seven are white, edged and tipped with yellow. This is a native of Cayenne, and it is eight inches long. It is a very numerous species, docile, and not shy; it feeds on the flowers of the erythrina corallidendron.

VERSICOLOR; Waved Parrakeet. Green; head and chin brown, the latter waved with tawny; wings blue, with a flame-coloured bar; belly pale blueish-purple, with brown waved lines. It inhabits Cayenne and Surinam.

SQUAMMOSUS; Scaly Parrakeet. Green; feathers of the head, neck, and breast, edged with orange. A native

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of Cayenne, and is only about eight inches and a half long.

INCARNATUS; Red-winged Parrakeet. Green; bill, legs, and claws, carnation; cere and orbits whitish; chin and wing-coverts red. It inhabits India.

MURINUS; Grey-breasted Parrakeet. Olive; face, chin, and breast mouse-colour; quill-feathers green. Inhabits Montevideo; it is about ten inches long, and is easily tamed.

CORNUTUS; Horned Parrot. Green; head scarlet, with two long feathers standing out like horns; the collar and rump are straw-colour; the outer edge of the quill and tail-feathers blue. It inhabits New Caledonia, as does the next.

CALEDONICUS; Caledonian Parrot. Olive; crown greenish-yellow; tail-feathers whitish at the tip, the outer edges of the four outermost pale blue.

NOVÆ-SEELANDIÆ; Red-rumped Parrot. Green; front purple; crown greenish-tawny; a red stripe from the base of the bill through the eyes; tail-feathers blueish, the two middle ones edged with green; the rump is red. It inhabits New Zealand, and is 15 inches long.

NOVÆ HOLLANDIÆ; Crested Parrakeet. Olive; crested head and chin yellow; behind the eyes there is a red spot, and an oblique band across the wings. It is a native of New Holland, and is a foot long.

FORMOSUS; New Wales Parrot; and sometimes it is denominated the black-spotted parrakeet of Van Diemen's Land. This species is green; the four middle tail-feathers barred with green and black, the rest with black and yellow; the bill and legs are black, and the tail much wedged. This is a most beautiful and elegant species, about a foot long, inhabiting New South Wales, and other parts of New Holland. It is rarely seen, except on the ground, particularly in moist places. It is not known to perch on trees like other parrots, but rises from among the grass, and immediately alights in it again. The legs and toes are more slender than usual in this genus, and the claws more straight.

ULIETANUS; Society Parrot. Olive; head black-brown; rump dusky-red; wings and tail dusky. It inhabits Ulietea, and is 10 or 11 inches long.

MULTICOLOR; White-collared Parrot. Green; head, chin, and belly blue; fore-part of the breast red, hind-part and tail beneath yellow; collar white. It inhabits India; the bill is red, and the head is ornamented with a white crescent.

AUREUS; Golden-crowned Parrakeet. Green; cere and orbits blueish-carnation; crown golden; wing-coverts with an oblique blue stripe. It is a native of Brazil.

LINEATUS. Green; quill-feathers beneath brown, the inner edge pale. This is about the size of a turtle-dove.

CONCINNUS; Crimson-fronted Parrakeet. Green; spot behind the eyes and front crimson; the crown is blueish. It inhabits New Holland, and is the size of a turtle-dove.

PACIFICUS; Pacific Parrakeet. Green; spot behind the eyes and each side of the rump red; front red; outer edge of the wings blue; tail beneath ash. There are five other varieties; 1. No spots on the rump; quill-feathers blue. 2. Rump and temples red. 3. Crown yellow. 4. Hind-head, spot below the eyes, and sides of the belly, scarlet. 5. Crown blue; hind-head spotted with yellowish-green, the shoulders are edged with yellow. This species, in all its varieties, inhabits the islands in the Pacific ocean.

PALMARUM; Palm Parrot. Green; bill and legs red; quill-feathers tipped and edged with black. It is found among the palm trees in Tanna island.

AUSTRALIS; Blue-crested Parrakeet. Green; crown blue, crested with long feathers; chin and middle of the belly red, thighs purple. It is found in the Sandwich islands, and is six or seven inches long.

PEREGRINUS; Peregrine Parrakeet. Green; on each wing there is a longitudinal brown spot. It inhabits the islands in the Pacific ocean, and is about eight inches long.

TAITIANUS; Otaheite Parrakeet. Blue; feathers of the head long; chin and throat white, bill and legs red. This is a native of Otaheite; it is five inches long; feeds on the fruits of the banana; the tongue is fringed at the end; the body is often white beneath.

CYANEUS; Blue Parrakeet. Body entirely of splendid full blue. This also is found in Otaheite, and has been thought to be a variety of the last.

PUSILLUS; Timid Parrakeet. Olive brown; frontlet scarlet; tail-feathers within, near the base, scarlet. This inhabits New South Wales, and is seven inches long.

PYGMÆUS; Pigmy Parrakeet. Green; feathers tipped with greenish-yellow; quill-feathers within dusky. It inhabits the islands in the Pacific ocean, and is six inches long.

AGILIS; Agile Parrot. Green; primary quill-feathers blueish, with tawny coverts; tail hardly lengthened, beneath red; orbits cinereous. It inhabits America, and is 10 or 11 inches long.

SANGUIOLENTUS; Red-shouldered Parrot. Green; frontlet crimson; crown, and outer edge of the wings, deep blue; shoulders, and wings beneath, blood-red. This is found in New South Wales.

B. *Tails short, equal at the end.*

CORONATUS; Crowned Cockatoo. Green; crest plicatiled red, tipped with blue. This is about 18 inches long, and inhabits Guiana and Surinam.

ATERRIMUS; Black Cockatoo. Black; crest large, paler; cheeks red, naked. This is three feet long, and found in New Holland.

FUNEREUS; Funereal Cockatoo. Black; middle of the tail straw-colour freckled with black. This likewise is a native of New Holland, and is nearly as large as the last.

BANKSI; Banksian Cockatoo. Splendid black; crest small; head and wing-coverts dotted with buff; outer tail-feathers scarlet in the middle, barred and tipped with black. This is about three feet long, and found in New Holland. There are two varieties; *viz.* 1. Sides of the neck, chin, and throat yellow; this is about 22 inches long. 2. Dusky-brown inclining to olive; tail, except the two middle feathers, crossed with a broad red bar. The size of the former.

SULPHUREUS; White Cockatoo. White; crest folding pointed, and with the spot beneath, the eyes sulphur-yellow. It is about 14 or 15 inches long, and inhabits the Molucca islands.

GALERATUS; New Wales Cockatoo. White; crest long, folding, pointed, sulphur; base of the tail sulphur. It inhabits New South Wales, and is twenty-seven inches long.

PHILIPPINARUM; Red-vented Cockatoo. White; crest folding, sulphurous, white at the tip; orbits yellowish-red; the lower tail-coverts are red, dotted with white. This is a native of the Philippine islands.

MOLUCCENSIS; Molucca Cockatoo. White, inclining to pale rosy; crest beneath red; lateral feathers within from the base to the middle sulphurous. This species and the next inhabit the Molucca islands, and are about seventeen inches long.

CRISTATUS; Great white, or yellow-crested Cockatoo. White; crest folding and yellow; the feathers of the neck are loosely flowing; the crest is five inches long, and capable of being erected. It is about eighteen inches in length, and the size of a domestic ordinary fowl. This and several

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several others of the species frequently repeat the word *cockatoo*.

ERYTHROLEUCUS; Red and white Parrot. Cinereous; rump, quill and tail-feathers scarlet.

ERYTHACUS; Hoary Parrot. Hoary; temples naked, white; tail cochineal or scarlet. There are three varieties: *viz.* 1. Wings red. 2. Variegated with red. 3. Red; head cinereous; cheeks naked; primary quill-feathers brown-ash. They all are natives of Africa, and about twenty inches long. This species is very loquacious, modulating its voice in various tones, and easily repeating whatever it hears. It is sometimes called Jaco, from one of its most frequent sounds.

CINEREUS; Cinereous Parrot. This is entirely of a blueish-ash colour. It inhabits Guinea, and is larger than the last species.

MERIDIONALIS; Southern Parrot. Above greenish-ash, beneath bright bay; orbits, crown, hind-head, and neck cinereous; the feathers are tipped with brown. It inhabits New Zealand, and is about sixteen inches long.

MASCARINUS; Mascarine Parrot. Cinereous; frontlet beneath black; orbits naked, reddish; lateral tail-feathers whitish at the base.

FUSCUS; Brown Parrot. This is entirely of a brown-ash, and thirteen inches long.

GARRULUS; Ceram Lory, or Ceram purple Parrot. Red; orbits ash; cheeks and wings green; latter half of the tail-feathers blue. There are three varieties: 1. Scarlet coloured; wings green and black; tail-feathers yellow, the latter half greenish. 2. Shoulders spotted with yellow. 3. Most of the wing-coverts dotted with blue. It inhabits the Molucca islands.

DOMICELLA; Blue-cap Lory. Red; cap violet; wings green; shoulders and cheeks blue; orbits brown. There is a variety with a blue cap, black orbits, and yellow collar: but, according to some writers, these are male and female. They inhabit the East Indies, and are remarkable for speaking distinctly, and very quickly learning their lessons. They are very scarce birds, and fetch a high price.

LORY; Violet-cap Lory. Purple; cap violet; wings green; breast, cheeks, and tail blue; the orbits are of a pale flesh colour. It is a native of the Philippine islands.

PUNICEUS; Crimson Lory. This is of a deep scarlet colour, but beneath it is violet; lesser and under wing-coverts, quill-feathers within and underneath, blackish-brown. It inhabits Amboina.

RUBER; Molucca Lory. Red; area of the eyes and quill-feathers black; spot on the wing and under tail-coverts blue; tail chestnut at the tip. A variety has its shoulders, belly, vent, tips of the secondary quill-feathers, and greater wing-coverts, blue. It inhabits the Molucca isles and New Guinea.

GRANDIS; Grand Lory. Red; beneath mixed red, blue, violet, and green; nape violet; wings blue; tail tipped with yellow. A variety is varied above with brown and green; beneath it is blue; the edge of the wings and their under-coverts blue; the tail is chestnut colour. It inhabits Ceylon.

COCHINCHINENSIS; Cochinchina Parrot. Blue; front, nape, lower part of the neck, breast, and middle of the belly, scarlet. It inhabits, as its name imports, Cochinchina.

GUINEENSIS; Yellow-breasted Lory. Head and neck scarlet; eye-brows and breast yellowish; wings yellow-green, tipped with blue; belly, vent, and under part of the tail, hoary, tipped with scarlet. It inhabits Guinea.

PARAGUANUS; Paraguan Lory. Scarlet; head, neck,

vent, tail, shoulders, and wings, black. It is thought to be a native of Brasil.

NIGER; Black Parrot. Tail long and equal; the body is of a blueish-black; the bill and orbits are white. It inhabits Madagascar, and is thirteen inches and a half long.

CÆRULOCEPHALUS; Blue-headed Parrot. Blue; belly, rump, and tail green; crown yellow; quill and tail-feathers red. It inhabits Guinea.

VARIUS; Variegated Parrot. This species is varied with brown and blue; cheeks, chin, and throat whitish; quill and tail-feathers dusky-brown, the outer webs blue. It inhabits South America.

VIOLACEUS; Ruff-necked Parrot. This is of a violet colour, varied with mixed black and green; back dusky-green; greater quill-feathers black, the rest varied with yellow-green and red, with a rosy spot on their coverts. It is a native of America, and the size of a hen.

FRINGILLACEUS; Finch Parrot. Green; head blue; cheeks, chin, throat, and spot on the belly white, with a sort of bloody hue; the belly is of a violet colour. It is a native of South America, and is rather more than six inches long.

CHORÆUS; Chili Parrot. Green; beneath ash; orbits carnation. It inhabits Chili.

SINENSIS; Chinese Parrot. Green; under wing-coverts red, some of the greater and edge blue; tail beneath brown. It inhabits the southern parts of China, Amboina, and New Guinea, and is of the size of a hen.

MACRORHYNCHOS; Great-billed Parrot. Green; beneath inclining to yellow; wings mixed blue and green, with black coverts. It inhabits New Guinea, and is fourteen inches long.

NASUTUS; Gristled Parrot. Green; head and breast greenish-grey; wing-coverts yellow. It is a native of China, and is twelve inches long.

GRAMINEUS; Grass-green Parrot. Green; beneath olive; front and crown blue; tail beneath yellow. It is sixteen inches long, and a native of Amboina.

LEUCOCEPHALUS; White-fronted Parrot. Green; quill-feathers blue; front white; orbits snowy. There are the following varieties: 1. Throat red; the feathers edged with white; belly purple; quill-feathers blue on the outer webs. 2. Head from the front to the neck white, the rest pale blue; orbits and spurious wings red. 3. Crown blueish-ash; belly spotted with red. These are found in Martinico, Jamaica, and New Spain.

GERINI; Gerin's Parrot. Green; head white; shoulders, some of the middle quill-feathers, and tail-feathers within at the base, red. This is a native of Brasil.

OCHROPTERUS; Yellow-winged Parrot. Green; front and orbits whitish; crown, cheeks, chin, throat, and remoter wing-coverts, yellow. It is thirteen inches long, and is found in South America. A friend of Buffon possessed one of this species, which shewed a strong attachment to his master, but was yet of a very capricious temper, expecting a full return for every demonstration of its civility. It would, in play, sometimes bite a little too hard, and laugh heartily at the act; but if chastised, it became refractory, and could only be reclaimed by gentle and kind treatment. It took much delight in tearing every thing to pieces; was dull and silent, if confined in its cage; but when set at liberty, it chattered incessantly, and repeated every thing that was said. It was very fond of children, which is contrary to the usual disposition of parrots. During the moulting season, it appeared dejected and uneasy for three months together. It subsisted chiefly on hemp-seed, nuts, fruits of all kinds, and bread soaked in wine, but preferred

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flesh, when it could get at it: when, however, it was indulged much in this latter article, it became dull and heavy, and shortly after began to lose its feathers. It was also observed to make use of a sort of rumination.

OCHROCEPHALUS; Yellow-headed Parrot. Green; crown yellow; wing-coverts red; quill-feathers variegated with green, black, violet, and red; the two outer tail-feathers within red at the base. There are two varieties of this species: 1. Crown with a yellow spot; bill ruddy. 2. Upper mandible blueish-green, with yellow sides, and a black spot at the tip; lower of a lead-colour, yellow in the middle. This species is from sixteen to eighteen inches long. It inhabits South America.

BARBADENSIS; Ash-fronted Parrot. Green; orbits and front cinereous; crown, cheeks, chin, throat, and lesser wing-coverts yellow, the greater blue; many of the primary quill-feathers without violet, the rest from the base to the middle red, and afterwards blue. Inhabits Barbadoes, and is the size of a pigeon.

LUCIONENSIS; Manilla Parrot. Green; hind-head and rump blue; wings marked with black, blue, and red. It is found in Luzonia, and is more than a foot long.

ÆSTIVUS; Amazon Parrot. Green, slightly spotted with yellow; the front is blue; shoulders blood-red; orbits carnation. There are eight varieties of this species, viz. 1. Head and breast yellow; front and chin blueish; edges of the wings and vent red. 2. Lesser wing-coverts red. 3. Cap blue, variegated with black; a yellow spot on the crown, and each side below the eyes; chin blue. 4. Crown, cheeks, and chin yellow. 5. Pale green; front pale yellow; temples tawny. 6. Green; front blue; crown, cheeks, chin, and middle of the belly, yellow. 7. Green; head and neck yellow; shoulders red. 8. Green, variegated with yellow; front blue; shoulders red. These are all natives of South America, excepting the first variety, which is a Jamaica bird.

LUTEUS; Yellow-shouldered Parrot. Green; crown blue; shoulders yellow; great wing-coverts with an orange spot. It inhabits South America.

PULVERULENTUS; Mealy Parrot. Green; above mealy; spot on the head yellow, on the wings red. It is found in Cayenne, is very large, and speaks distinctly.

HAVANENSIS; Blue-fronted Parrot. Green; the front, the chin, and throat, are of an ashy-blue; on the breast is a large red spot; the orbits are cinereous. It inhabits Havannah, and is a foot long.

PARADISI; Paradise Parrot. Yellow; chin, belly, and base of the tail-feathers red. This is rather longer than the last, and inhabits Cuba.

AURORA; Aurora Parrot. Yellow; arm-pits, edges of the wings, and greater quill-feathers without in the middle red. It inhabits Brasil.

PASSERINUS; Passerine Parrot, or blue and green Parakeet. Yellowish-green; spot on the wings, and wings beneath blue. It inhabits Brasil and Guiana, and is about the size of a common house-sparrow.

CYANOLYSEOS; Blue-collared Parrot. Yellowish-green; collar blue; rump red. This species is something larger than a pigeon. It inhabits Chili, where it is called *thecau*, and where it does a deal of mischief to the corn, flying always in flocks. When the troop is about to fettle, one of them acts as sentinel on a tree, and gives the alarm if any person approaches, on which account it is very difficult to shoot them. This species breeds in the holes of rocks, laying two white eggs in the most inaccessible and craggy parts. From the tops of the cliffs the inhabitants in pursuit of them let themselves down by ropes. Both the eggs and

young birds are reckoned very delicate eating. If robbed of its young, this bird will lay a second time, and sometimes even a third. It is easily tamed, and learns to speak well.

SORDIDUS; Dusky Parrot. Brownish; chin blue; wings and tail green; bill and vent red. It is about the size of a pigeon, and inhabits New Spain.

DOMINICENSIS; Red-banded Pigeon. Green; band on the forehead red; lunules on the neck and back black; quill-feathers blue. It is a native of St. Domingo.

ERYTHROPTERUS; Crimson-winged Parrot. Green; orbits blackish; middle of the back black, lower part blue; wing-coverts red. It inhabits New South Wales.

FESTIVUS; Festive Parrot. Front purplish, eye-brows and chin blue; back blood-red. It inhabits Guiana; is eleven inches long, very active, but fierce and untractable.

ROBUSTUS; Robust Parrot. Green; head somewhat ash; wing-coverts dirty black, edged with green; spot on the wings red. It is the size of a pigeon.

MAGNUS; New Guinea Parrot. Green; greater quill-feathers blue, lesser beneath red. It inhabits New Guinea.

ORIENTALIS; Eastern Parrot. Green; outer edge of the wings and primary quill-feathers blueish; tail yellow at the tip. It inhabits India.

ADSCITUS; Blue-cheeked Parrot. Green; cheeks and wings blue; back on the fore-part black, with yellow streaks, hind-part yellowish.

BATAVENSIS; Batavian Parrot. Green, with yellow streaks; hinder part and nape blackish; face and thighs scarlet. It is a native of Batavia.

TARABA; Tarabe Parrot. Green; head, chin, throat, breast, and lesser wing-coverts red. It inhabits Brasil, and is ten inches long.

BRASILIENSIS; Brasil green Parrot. Green; face red; temples blue; orbits ash. This also is a native of Brasil, and is thought to be a variety of the next.

AUTUMNALIS; Autumnal Parrot. Green; front and spot on the quill-feathers scarlet; crown and primary quill-feathers blue. There are two varieties: 1. Front and chin blue. 2. Head variegated with red and whitish. It inhabits Guiana, and is the size of the last.

COCCINOCEPHALUS; Scarlet-headed Parrot. Green; crown and front scarlet; rump greenish-yellow; quill and tail-feathers blue without. Size of the mistle thrush.

ACCIPITRINUS; Hawk-headed Parrot. Green; head grey; neck and breast varied with blueish; quill and tail-feathers tipped with blue. There is a variety, of which the feathers of the head are white, long, and narrow, streaked with black. The former is a native of India; the latter of Guiana, where it is domesticated. When angry it erects its crest.

MENSTRUUS; Blue-headed Parrot. Green; head blueish; vent red. This species is found in Guiana; it is not very docile, and has the voice of a jack-daw. It is the size of a turtle dove.

PURPUREUS; Purple-bellied Parrot. Above black-brown, beneath purple; crown and cheeks black; orbits blue; collar with dirty spots; quill and tail feathers blue. It inhabits Surinam.

MELANOCEPHALUS; White-breasted Parrot. Green, yellow beneath; cap black; breast white, orbits flesh-colour. Its length is nine inches and a half. It inhabits Mexico, Guiana, and the Caraccas in South America. It frequents woods, and is rarely seen in inhabited districts. Its call is a shrill whistle, which it often repeats in its flight, and it does not learn to talk like other birds of this genus. According

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to Mr. Latham, the white-breasted parrots fly in small numbers together, but are perpetually quarrelling with one another; and if any one is taken, it refuses all food, till at length it is starved to death. Parrots of the most stubborn nature are often subdued by means of the smoke of tobacco; but this bird is only put into bad humour by the attempt. Buffon has observed that "it is thicker and shorter necked than most parrots; that its feathers are more stiffly set on, and that it is of a more dull and sluggish disposition."

PILEATUS; Hood Parrot. Green; head black; orbits white; spot on the shoulders blue; tail tipped with blue. It inhabits Cayenne, is about eight or nine inches long, and migrates.

LUDOVICANUS; Orange-headed Parrot. Sea-green; head tawny, inclining to red towards the bill. This species inhabits Louisiana; it feeds on the seeds of the *Bromelia* and *Liriodendron*, which see; it flies in large flocks, making a great noise; is not easily taught to speak, and is about thirteen inches long.

COLLARIUS; Red-throated Parrot. Green; chin reddish; throat red. It is a native of Jamaica, and about the size of a pigeon.

SENEGALLUS; Senegal Parrot. Green; beneath yellow; head cinereous; orbits black and naked. This, as its name imports, is found on the sandy shores of Senegal; its voice is harsh and unpleasing; it flies in flocks of six or seven, and rests on the top branches of trees.

TUIPARA; Red-fronted Parrot. Pale-green; lunule on the front red; spot on the middle of the wings yellow. It inhabits Brazil.

CHRYSOPTERUS; Golden-winged Parrot. Green; spot on the wings blue and tawny; orbits naked and white. It inhabits India.

PULLARIUS; Ethiopian Parrot. Green; front red; tail tawny, with a black band; the orbits are cinereous. This is not six inches long. It inhabits Guiana, Ethiopia, India, and Java; it imitates the manners of other birds, but does not easily learn to speak, and is fond of its own tribe.

MALACCENSIS; Malacca Parrot. Green; front and rump blue; under wing-coverts red.

CERVICALIS; Red-naped Parrot. Green; front and semilunar spot on the nape, under part of the throat, and breast scarlet.

INDICUS; Indian Parrot. Green; orbits pale flesh-colour; crown red or orange; hind part of the rump red; quill-feathers within and tail without blueish-green. It is a native of India, and about the size of a lark.

VERNALIS; Vernal Parrot. Bright green; wings paler; throat, rump, and tail blood-red.

GALGULUS; Sapphire Parrot. Green; rump and breast scarlet; the crown of the male bird is blue. There is a variety that has a yellowish-blue head, with a transverse orange bar behind; the front, the under part of the throat, and tail-coverts red. This species is about five inches long, and inhabits the Philippine islands. It sleeps suspended by one foot, and is very fond of the fresh juice of the cocoa-nut tree. If this is confined in a cage it seldom whistles, and grows fullen. It suspends itself by its feet, so that the back is turned towards the earth, and seldom changes this situation. Its favourite food is boiled rice. The nests are remarkable for the fineness of their texture. "If," says a traveller, "they had a different construction, the monkeys would be very mischievous to them; but now, before they can get to the opening, the lowest part, being the weakest, breaks in pieces, and the depredator falls to the ground, without in the least annoying the birds."

ANACA; Chestnut Parrot. Green; beneath tawny-brown; crown bay; spot on the back and tail pale-brown; wings edged with red. It inhabits Brazil, and is the size of a lark.

PURPURATUS; Purple-tailed Parrot. Green; crown and neck cinereous; rump, edge of the wings, and tips of the spurious wings, blue; tail purple, edged with black. It inhabits Cayenne, and is eight inches long.

CANUS; Grey-headed Parrot. Green; head, chin, and throat grey-green; tail rounded, with a broad black band. It inhabits Madagascar.

MELANOPTERUS; Black-winged Parrot. Pale-green; back, wing-coverts, band on the tail, and primary quill-feathers black; the secondary yellowish, dotted with blue. It inhabits Java and Luzonia, and is six inches long.

CAPENSIS; Cape Parrot. Green; some of the quill-feathers blue; bill and legs reddish. Inhabits the Cape, and is four and a half inches long.

TORQUATUS. Green; hind-head with a yellow transverse band streaked with black. This species inhabits the Philippine isles, and is five and a half inches long, and does not talk.

MINOR; Lesser Parrot. Green; crown scarlet; breast blue; greater quill-feathers black. It inhabits Luzonia, and is smaller than the last.

TOVI. Green; throat with a pale-orange spot; wings with a broad chestnut band, of a gold-green hue; about seven inches long, and is supposed to inhabit America.

TIRICA. Green; bill flesh-colour; legs and claws blueish. It is a native of Brazil and Jamaica, and the size of a lark.

SOSOVE; Cayenne Parrakeet. Green; a pale yellow spot on the wings and tail-coverts. This is a native of Guiana; is easily tamed, and is very talkative.

TUI; Gold-headed Parrakeet. Green; front orange; orbits yellow. It inhabits Brazil, and is the size of a starling.

ERYTHROCHLORUS; Red-tailed Parrot. Green; head crested; wings and tail red. It is the size of a black-bird; the crest of this bird consists of six feathers, three of which are longer and moveable at pleasure.

MEXICANUS; Mexican Parrot. Green; front crested; wing-coverts and tail purple; orbits blue; chin yellow; neck red. This is a native of New Spain, and is about seven inches long.

Among the many parrots that have been imported into this country, the one whose imitative talent was reckoned most extraordinary, belonged to colonel O'Kelly, which he purchased for 100 guineas. This bird not only repeated a great number of sentences, and answered questions, but was able to whistle many tunes. It appeared to have an accurate ear for music, and would beat time while it whistled; and if by chance it mistook a note, it would revert to the bar where the mistake occurred, and finish the tune with great accuracy. The writer of this article is at the moment within hearing of a bird, that will imitate the whistling of a black-bird and thrush, with a vast degree of accuracy. Colonel O'Kelly's parrot could express her wants articulately, and give her orders in a manner nearly approaching to rationality; she could sing a number of songs in perfect time and tune.

PSITTACUS. See *TROGON Curucui*, *ALCA Arctica*, *LOXIA Cardinalis*, *CORYPHÆNA*, and *LABRUS*.

PSKOV, or **PLESKOW**, in *Geography*, a city of Russia, capital of a government, situated on the river Velika, where it discharges itself into the Tchudskoe lake; the see of an archbishop,

archbishop, and an university; 136 miles S.S.W. of Peterburg. N. lat. $57^{\circ} 50'$. E. long. $28^{\circ} 14'$.

PSKOVSKOI, a government of Russia, so called from its capital Pskov; bounded on the N. by the governments of Petersburg and Novgorod, on the E. by the government of Tver, on the S. E. by that of Smolensk, on the S.W. by that of Polotsk, and on the W. by that of Riga; about 200 miles long, and 96 broad. N. lat. $54^{\circ} 40'$ to $57^{\circ} 12'$. E. long. $27^{\circ} 24'$ to $32^{\circ} 34'$.

PSOAS, in *Anatomy*, the name of two muscles situated in the lumbar region.

The *psoas magnus* (prélombo-trocantinien) is placed at the lateral and inferior part of the vertebral column, at the side of the upper aperture of the pelvis, and in the upper part of the thigh. It extends from the side and lower part of the last dorsal vertebra to the apex of the trochanter minor. It is elongated, and larger in the middle than at the two extremities; so that it resembles two triangular pyramids joined at their bases. The external surface of the psoas slants backwards: it is covered above by the diaphragm, lower down by the kidney, the peritoneum, and the psoas parvus: still lower it becomes anterior, and is covered by the artery of the lower extremity. The posterior surface covers the quadratus lumborum, from which it is separated by the anterior branches of the lumbar nerves and the anterior layer of the aponeurosis of the transversus; it also covers the transverse processes of the lumbar vertebra, to the basis of which it is attached, excepting the fifth. About the middle of the psoas its posterior surface covers the ilio-lumbar ligament, and the iliacus internus muscle; it is at first separated from the latter by cellular tissue, by the lumbar nerves, and the ilio-lumbar vessels: the two muscles then become inseparably united. The tendon of the psoas, with the fleshy fibres of the iliacus internus coming to join it, covers the excavation on the front of the os innominatum from the anterior superior spine of the ilium to the linea ilio-pectinea. Lower down it covers the orbicular ligament of the hip-joint. Between the latter and the os innominatum on one side, and the tendon on the other, a bursa mucosa is placed, which communicates sometimes with the cavity of the joint. The internal surface of the muscle covers the side of the bodies of the lumbar vertebræ, and of their fibro-cartilages, to which parts it is attached, but only at the upper and lower part; for, at the middle of the bodies, it is separated from them by the lumbar vessels, and by the communicating filaments between the lumbar nerves and the great sympathetic. Between this internal surface, and the last lumbar vertebra, there is an interval filled by cellular substance: the surface then becomes narrower, and descends along the side of the upper aperture of the pelvis, covered by the external iliac vein and the tendon of the psoas parvus. Below the crural arch, the internal surface of the psoas grows still narrower, and is converted into an edge, which is parallel to the pectinalis, and separated from it by the internal circumflex vessels.

The upper extremity of the psoas is thin and pointed, and attached to the inferior and lateral part of the last lumbar vertebra, and sometimes to the posterior extremity of the last rib. Thence it descends along the side of the vertebral column, growing larger. It runs along the upper aperture of the pelvis, diminishing again in bulk, and directed a little outwards. Confounded with the iliacus internus, it passes out of the pelvis behind the crural arch, then descends on the upper and front part of the thigh, directed obliquely backwards and outwards, to the tro-

chanter minor, in the apex and anterior part of which it terminates.

The inferior extremity of the psoas magnus is formed by a strong tendon, common to it with the iliacus internus, and continued into the body of the muscle, as far as its middle, increasing in breadth. The fleshy fibres arise by short aponeuroses from the bodies of the last dorsal, and four upper lumbar vertebræ, their fibro-cartilages, and the transverse processes of the four first lumbar vertebræ; they terminate on all sides of the tendon, which they accompany very low, particularly on the inside.

The psoas magnus carries the thigh forwards on the pelvis, and rotates it outwards. If the thigh is fixed, it will bring the pelvis forwards on it, as in stooping to bring the hand to the ground. It may also bring the loins forwards on the pelvis. When the trunk is inclined backwards, it will restore it to the erect attitude; in the latter posture, it maintains the pelvis in equilibrio on the thigh, and prevents it from yielding backwards. It is much employed both in standing and walking.

The *psoas parvus* (prélombo-pubien), which does not always exist, is a long, thin, and flat muscle, situated on the outer and anterior part of the psoas magnus, and extending from the body of the last lumbar vertebra to the ilio-pectineal eminence. It is covered on the outside by the diaphragm, the renal artery and vein, the peritoneum, and the external iliac artery. Its internal surface covers the psoas magnus, and is united to it by loose cellular tissue. The upper extremity is fixed to the lower and lateral part of the body of the last dorsal vertebra, and to the fibro-cartilage between it and the first lumbar. It passes obliquely downwards and outwards, and soon forms a flattened tendon, which increases in breadth as it descends, covers the lower and anterior part of the psoas magnus, and terminates by an insertion in the ileo-pectineal eminence, and in the crista of the pubes. This tendon is continued, on the outside, into a fascia, which covers the iliacus internus, and joins the fascia lata (see FASCIA): the upper third of the psoas is fleshy; the two lower are tendinous. It will bend the pelvis on the loins, or the loins on the pelvis, according as the one or other of these is the fixed point.

PSOAS *Abscess*, in the language of *Surgery*, denotes a collection of purulent matter, which sometimes takes place in the course of the psoas muscle, and is a disease that is frequently attended with considerable danger. It is often called a *lumbar abscess*. It is occasionally the consequence of an acute inflammation of the cellular substance which lies about the psoas muscle; but, in by far the majority of examples, the inflammation which precedes it is entirely chronic. The inflammation of this last kind is merely accompanied with a pain about the loins, extending up the back, and down towards the thigh. Such pain is increased when the thigh is raised, or extended backward, or when the patient holds himself quite erect. Hence it is observable, that the patient, whether standing or walking, is obliged to incline his trunk forwards. When the inflammation is acute, the pain is severe; but when it is chronic, the uneasiness which the patient experiences is duller, and alternately subsides and recurs, and may easily be mistaken for sciatica, the pain arising from hemorrhoids, or that proceeding from disease of the kidney. The acute inflammation is usually attended with evident febrile symptoms; the chronic is seldom accompanied with them. The first falls into a state of suppuration with all the ordinary symptoms; the second suppurates for the most part slowly and imperceptibly, and often not till after a period of several months.

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The inflammation may be produced by a variety of causes. It may arise from a violent strain of the psoas muscle in leaping, raising a heavy weight, or in some other forcible bodily exertion. Sometimes it is brought on by exposure to cold, or by a blow or fall on the lower part of the back. In the latter case, it often does not occur till long after the occurrence of the injury, so that its cause is already quite forgotten. In numerous examples, the psoas abscess appears also to originate from internal causes; at least, it is remarked, that the disease happens with particular frequency in unhealthy subjects. In such cases, the commencement of the disorder is in general very obscure and imperceptible. All experienced surgeons have noticed how many of the patients with psoas abscesses are manifestly of a scrofulous habit. It has been supposed that the disease is commonly occasioned by a caries of the vertebræ, which are situated close to the origin of the psoas muscle. (Ford on Diseases of the Hip-joint.) Possibly this may sometimes be the real cause; but it is not invariably so; for in psoas abscesses it often happens that no caries whatever exists; and when it does, it may, with equal probability, be regarded as an effect of the abscess. Richter's *Anfangsgr. der Wundarzneykunst*, band 5. kap. 5.

The original situation of the abscess is generally in front of the psoas muscle, and very near to it; but it is also, in many instances, behind this part. By degrees the matter makes its way outward, though a long period often elapses ere this happens. Abscesses which follow acute inflammation usually point much earlier than those which are the consequence of chronic inflammation. In the former cases the cellular substance is apt to be extensively affected, and it falls into a state of suppuration; besides, acute inflammations much more quickly suppurate than those of the chronic kind.

While the abscess does not present itself externally, the diagnosis is attended with considerable difficulty and uncertainty. After the usual symptoms of inflammation, the patient is indeed conscious of several particular local sensations. For instance, he is sensible of weakness in the loins, which are also exquisitely tender on being touched, or when the thigh is moved, and the lower extremity is remarkably weak. Frequently some general signs of suppuration likewise occur, such as hectic fever, nocturnal sweats, diarrhœa, cough, &c. But all the local symptoms may be considered by the surgeon as proceeding from rheumatism, disease of the kidney, or hemorrhoidal complaints. In the early stage of the psoas abscess, the general symptoms of suppuration are hardly ever very obvious. The previous signs of inflammation are mostly so mild, and precede the formation of matter so long, that they often pass unnoticed. Besides, all conjectures respecting the nature of the disorder avail nothing, as the practitioner can adopt no effectual measures before the abscess presents itself externally.

The psoas, or lumbar abscess, presents itself in a variety of situations. In common cases, the matter descends, by its own weight, in the course of the psoas muscle, passes under Poupart's ligament, and occasions a fluctuating tumour in the soft part of the abdomen. The tumour is free from pain and inflammation; a circumstance which indicates that the matter is not formed in the situation of the swelling itself. The diminution of the local complaints about the lumbar region after the swelling has occurred; the manner in which the tumour is increased when the patient holds his breath or coughs; its sub-

sidence in an horizontal position, and under external pressure, together with other symptoms already noticed, are sufficient to prove that the matter in the swelling arises from a psoas abscess. There is a possibility of mistaking the tumour for a femoral hernia, as it is diminished when it is compressed, or the patient is in the recumbent posture. Such a mistake, however, cannot easily be made, because all other signs of a hernia are absent; the reduction and recurrence of the tumour are not proportioned to each other; a distinct fluctuation may be felt; and the general and local symptoms of a psoas abscess have prevailed. Sometimes also the swelling subsides so much, that betwixt it and Poupart's ligament, the surgeon can feel an interspace, which is entirely free from tumour.

The swelling in the bend of the thigh seldom attains a considerable size, for the matter commonly soon makes its way under the fascia of the thigh. In this circumstance it sometimes descends close to the knee, where it occasions a large external tumour, as in the groin. In some instances the matter collects itself into an abscess, near the insertion of the psoas muscle, at the inside of the thigh. Sometimes it passes down into the pelvis, and causes a swelling in the vicinity of the anus. In particular examples, it makes its way towards the loins and buttocks, and the swelling presents itself just where abscesses, arising from disease of the hip joint, frequently occur. In such cases, the sacrum and os coccygis are frequently carious. In less common examples, and probably when the matter is originally formed in the cellular substance, behind the psoas muscle, the abscess makes its way backwards, and occasions a swelling somewhere in the back. In still more unusual cases, the matter perforates the abdominal muscles, and produces a tumour in the belly. In all these instances, the previous general and local complaints; the subsidence of the latter, as soon as the swelling presents itself externally; the increase of the tumour, when the patient is erect, holds his breath, or coughs; and the diminution of it under external pressure, or by change of posture; are circumstances fully indicating the source of the matter.

An inflammation of the psoas muscle and adjacent cellular substance, not attended with any material degree of suppuration, would not be of itself a dangerous disorder, and no doubt might, in the generality of cases, admit of a curative plan adapted to the nature of the cause. General and local bleeding, blisters, cold applications, the exhibition of calomel, opium, and other antiphlogistic medicines; and the observance of rest, a horizontal posture, and, more especially, the avoidance of all motion of the thigh, by which the pain is always increased; seem well calculated to put a stop to the complaint, when its real character is discovered, at an early period of its progress. The pain in the loins, which is the principal symptom of such inflammation, is for the most part so moderate, that it is disregarded, and, as it may proceed from numerous causes, its true cause is generally not understood. The inflammation is only paid much attention to when it is acute, and hence this case is, in fact, the least serious, though the most uncommon.

When the inflammation has already terminated in suppuration, the abscess ought to be opened as soon as possible, that is to say, immediately it presents itself in some external situation; for, prior to this occurrence, no surgical operation is at all proper or practicable. As it is constantly advantageous to open the abscess early, and the collection of matter is generally late in presenting itself outwardly, it would be desirable, if the surgeon had any means by which he could promote the progress of the matter to the surface of the body; but, unfortunately, no such means have hitherto been devised.

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devised. The source of the matter lies so deeply, that no effect can reasonably be expected from the employment of external emollient applications.

Experience has clearly proved, however, that when the abscess is opened in the common manner, death generally takes place sooner than if no opening at all were made. A fever, accompanied with nocturnal sweats and diarrhoea, commonly soon comes on after the abscess has been punctured; the matter becomes thin, fetid, and acrid, and is incessantly discharged in large quantity; so that the patient at length dies debilitated and exhausted. This fatal event has been ascribed by surgical writers to a variety of causes; some dwell upon the entrance of the external atmospheric air into the cavity of the abscess; some build conjectures on the great distance of the source of the matter from the surface of the body, and from the reach of the practitioner; while others take more into consideration the ample extent of the cyst of the abscess.

The following circumstances seem to prove, says Richter, that the external air which enters the cavity of the abscess after the operation, has a material share in producing the bad and fatal symptoms. The fever and pain always become more violent after the opening has been made than they were previously. The whole cavity of the abscess appears to be in an inflamed state, in consequence of the irritation arising from the atmospheric air. When the abscess is first opened, the matter is usually observed to be of a tolerably good quality; but, very soon afterwards, it becomes fetid, thin, and acrid. This sudden change in the matter is also imputed to the effect of the air. It is remarked, likewise, that the larger the opening is which the surgeon makes, the greater is the degree in which the preceding circumstances occur; while, on the contrary, the smaller the aperture is the milder they are, and the result of the operation is in proportion more successful. Hence, it is better to let the abscess break of itself, than make a large opening; for the aperture which is formed by ulceration is mostly a small one. Such lumbar abscesses as make their way through the abdominal muscles, and present themselves at the belly, are found to be less dangerous than others, perhaps (adds Richter) because the passage of the matter through the muscles towards the surface of the body is so crooked, that the opening of the tumour does not readily give admission to the air into the original cavity of the abscess, so as to excite inflammation and other bad consequences. Lastly, the observations of Mr. Abernethy prove, that the operation may be frequently repeated with the greatest success, provided it be done so as not to let the air enter the cyst of the abscess.

But, notwithstanding the preceding observations, it is now the opinion of the most accurate surgeons, that the bad effects of the air on abscesses have been exaggerated beyond all moderation. In the first place, it is almost certain that when a lumbar abscess is opened, no air at all can insinuate itself into the cyst, which is so strongly compressed by all the surrounding parts, that its capacity is diminished immediately the matter escapes from it. Secondly, even if air were injected into it, the consequences would not be so terrible as has been commonly represented. It is more probable that the irritation which a large opening itself produces in the extensive cyst, and the consequent inflammation of the whole of its surface, are the real cause of the violent fever which is so apt to arise, and of the changes in the quality of the matter afterwards secreted. We can believe with Hunter, that, were it possible to make a large opening in a lumbar abscess, even in a vacuum, the same dangerous conse-

quences would be just as likely to follow, as when such an opening is made while the surface of the body is exposed to the air.

The apprehension entertained by many practitioners in regard to mischief caused by the entrance of the air into the cysts of lumbar abscesses, has led to the almost universal advice to take the precaution of making the opening in such a way, that no opportunity will be afforded for the air to enter into the cavity from which the matter is discharged. It has also been the usual aim of practitioners to lessen the cyst of the matter, and bring it so near the surface of the body, that the case may be opened and treated like other abscesses, without any risk of dangerous consequences. Both these indications are fulfilled in the mode of treatment recommended by Mr. Abernethy, who opens the collection of matter with an abscess lancet, and as soon as the pus is discharged, brings the sides of the puncture together with sticking plaster, and heals the aperture by the first intention. Immediately the tumour rises again, it is emptied again in the same manner, and the operation may be repeated, if necessary, three or four several times, or even still more frequently.

In this plan of treatment, regularly as the matter is formed again after each operation, it descends, by its own weight, to the lower part of the cyst of the abscess under Poupart's ligament, where it occasions a return of the swelling. But before the upper part of the cyst is filled with matter again, the surgeon takes a proper opportunity of repeating the operation. Thus the highest portion of the cyst is continually kept empty, and, consequently, by degrees contracts itself, and is obliterated. The lower external part of the cyst, situated under Poupart's ligament, is all that remains, and an immense psoas abscess is in this manner converted into a small superficial abscess, which may now be safely opened, and treated like any ordinary case.

But in order to succeed in effecting this desirable alteration of the cyst of the abscess, the surgeon should not defer the second operation too long. Immediately the swelling is sufficiently prominent to admit of being opened with safety, the operation ought to be repeated. We may conclude, that the upper and deeper part of the cyst is obliterated, and that the psoas abscess is changed into one of a superficial kind, when, in the last operation, the quantity of matter discharged is small; when no more can be got out either by pressure, or making the patient stand up and cough; when no material impulse is communicated to the tumour by coughing; and when the swelling is no longer capable of being lessened by pressure, or the horizontal position. As soon as these changes are remarked, the radical operation may be undertaken, which consists in making an incision into the tumour, and healing it like any common abscess.

It is advantageous in puncturing a psoas abscess to let the opening have a perpendicular direction; for a transverse wound may easily be forced open again from violent coughing, or forcible extension of the thigh. When the external swelling is small, care must be taken not to injure the large crural vessels with the lancet. On this account, the opening ought to be made as much as possible towards the side of the tumour. During the operation the patient should stand up, and be directed to hold his breath, and cough frequently, so that all the matter may be discharged. When the surgeon entertains the slightest doubt concerning the nature of the swelling, he acts prudently in making the opening cautiously, with a bistoury, and not of too large a size. After the contents of the abscess have been let out, the opening ought always to be accurately closed with sticking plaster. The patient,

patient, throughout the treatment, must abstain from all exercise, and especially avoid moving the thigh, taking care, however, to be as much as he conveniently can in an erect posture.

In general, it will be proper to make the second puncture about a fortnight after the first. But if the swelling becomes very prominent earlier, and, particularly, if the first puncture puts on an inflamed appearance, the second opening ought to be made sooner. In every repetition of the operation, the quantity of matter will be found to be diminished, a sufficient proof that the cavity of the abscess is lessened. For instance, if in the first operation three pints of matter are discharged; in the second the surgeon will let out only about twelve ounces; in the third, six; in the fourth, four; and so on. After the abscess has been emptied three or four times, the upper portion of the cavity is usually obliterated, so that the radical operation for the cure of the lower and superficial remains of the abscess may now be attempted.

Candour urges us to confess, however, that there are cases in which the preceding mode of treatment proves ineffectual. Such are the examples, in which, notwithstanding every precaution, the cyst of the abscess inflames; the puncture ulcerates; where the disorder has originated from internal causes, which yet continue to influence and keep up the disease; where caries exists; and where the abscess has been the consequence of acute inflammation. It is particularly to chronic abscesses that the foregoing plan of treatment is adapted. When this treatment fails, two things may happen; the discharge may continue to be so profuse, that the patient is exhausted; or the abscess may end in a fistula, with which the patient may live a great while. The surgeon, however, is not to abandon all hope in the above description of cases. When the puncture inflames, the bad consequences may often be averted by speedily letting out the newly collected matter through another puncture, at some distance from the other, the antiphlogistic treatment being strictly observed. When some internal cause has a share in keeping up the disease, its removal is obviously indicated. Lastly, experience proves, that, though caries may exist, the termination of most cases is favourable. When the bones are suspected of being diseased, issues in the vicinity of them is a measure which should never be neglected.

Some writers and practitioners prefer opening lumbar abscesses with a seton; while others are advocates for the bold practice of letting out the matter with a trocar, the cannula of which they recommend to be left in the part, and closed with a stopper, which may be taken out as often as necessary, for the purpose of discharging the matter.

PSOL, in *Geography*, a river of Russia, which rises near Oboian, in the government of Kursk, and runs into the Dnieper, near Kremenzug, in the government of Ekaterinoflav.

PSOPHIA, *Trumpeter*, in *Ornithology*, a genus of birds of the order Grallæ: the generic character is, bill cylindrical, conic, convex, somewhat pointed, the upper mandible the longer; nostrils are oval, pervious; tongue cartilaginous, flat, fringed at the tip; feet four-toed, cleft. There are two

Species.

CREPITANS; Gold-breasted Trumpeter. Black; back grey; breast shining blue-green; orbits naked and red. The bill is yellowish-green; legs strong, tall, brownish-ash or green; beneath the back-toe is a round protuberance, at a little distance from the ground; the tail is very short; feathers of the head downy, of the lower part of the neck

squamiform, of the shoulders ferruginous, lax, pendulous, silky; scapulars long, pendent. This is the *agami* mentioned by voyagers: it is nearly twenty-two inches long, and about the size of a full-grown domestic fowl. It inhabits South America, particularly the interior parts of Guiana, in considerable troops. In its native haunts, it is not distrustful of man, and is susceptible of domestication in an eminent degree, acquiring many of the social habitudes of the dog. It emits from the lungs a harsh and uncommon noise, not unlike that of a child's trumpet, hence its trivial name. It stands on one leg, and sleeps with its neck drawn in between the shoulders; the eggs are blue-green.

UNDULATA; Undulated or African Trumpeter. Crest of the hind-head short and whitish; of the breast long, black, pendent. It is a native of Africa, and is the size of a goose.

PSORA, in *Botany*, $\Psi\omega\sigma\alpha$, *scurf of any kind*, and among others *that of trees*. Hence the name is employed to designate a supposed genus of *Lichenes*, established by Hoffmann, whose habit is crustaceous or scurfy. See LICHEN and LICHENES.

PSORA, $\Psi\omega\sigma\alpha$, in *Medicine*, a term which has been very generally, but incorrectly, applied to the contagious eruption of the skin, called *itch*.

The appellation, *psora*, was universally employed by the Greek physicians to designate a scaly or scurfy disorder of the skin, and not the vesicular or pustular itch. Occasionally, indeed, they conjoined the epithet $\epsilon\lambda\kappa\omega\delta\eta\iota\varsigma$, *ulcerating*, with the term *psora*; thus obviously distinguishing the ulcerating or pustular disease (which appears to have been *impetigo*), from the *psora* simply, which always signified the dry, scaly, or scurfy tetter, mentioned below under the appellation of *psoriasis*. Hippocrates classes the *psora* with lepra, alphas, and lichenes, considering them as blemishes, rather than diseases. And the Greek writers, who followed him, looked upon the prurigo, lichen, *psora*, and lepra, as progressive degrees of the same affection;—the prurigo being a simple itching,—the lichen, itching combined with roughness of the skin,—the *psora*, itching with branny exfoliations,—and the lepra, itching with actual scales. (See Actuarius, *Math. Med. lib. ii. cap. 11.*) The misapplication of the term to *itch*, seems to have originated with some of the early translators of the Greek writings, who considered *scabies* (quasi *scabrities*) as synonymous with $\Psi\omega\sigma\alpha$, or a roughness of the skin; whence the true scabies, or itch, was subsequently confounded with *psora*. (See ITCU.) Sir John Pringle remarks, that the general opinion, that the *psora* mentioned by the Greeks is the itch, is so far from being evident from their writings, that he is rather disposed to conclude, that the itch was either altogether unknown, or at least uncommon among the ancients. On *Diseases of the Army*, p. iii. chap. 8. See also Bateman's *Pract. Synopsis of Cutan. Diseases*. pp. 6 and 186, *notes*.

PSORALEA, in *Botany*, from $\Psi\omega\sigma\alpha\lambda\epsilon\iota\sigma\varsigma$, *scabby*, because the calyx, and other parts of the plant, are more or less besprinkled with glandular dots, giving a scurfy roughness. Linn. *Gen.* 386. Schreb. 508. Willd. *Sp. Pl.* v. 3. 1342. Mart. *Mill. Dict.* v. 3. Ait. *Hort. Kew.* v. 4. 374. Juss. 355. Lamarck *Illustr. t.* 614. Gært. *t.* 145.—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, dotted with tubercles, in five acute, permanent, equal segments, the lowermost only twice as long as the rest. *Cor.* papilionaceous, of five petals, with coloured veins; standard roundish, emarginate, directed upwards; wings crescent-shaped, obtuse, small; keel crescent-shaped, obtuse, of two petals.

petals. *Stam.* Filaments in two distinct sets, one simple and setaceous, nine combined, all ascending; anthers roundish. *Pist.* Germen superior, linear; style awl-shaped, ascending, the length of the stamens; stigma obtuse. *Peric.* Legume the length of the calyx, without valves, compressed, ascending, pointed. *Seed* one, kidney-shaped.

Eff. Ch. Calyx the length of the legume. Stamens in two distinct sets. Legume single-seeded, somewhat beaked, without valves.

The plants of this genus are chiefly shrubby, and the greater part natives of the Cape of Good Hope. A few are found in the south of Europe, and still fewer in America. The *leaves* are either pinnate, ternate, or simple. *Flowers* spiked or solitary, of a dull blue or dirty white. Linnæus has fourteen *Pforalea* in his *Sp. Pl.* two of which now enter the restored genus of *Dalea*. Willdenow has twenty-nine. Nineteen are mentioned in the new edition of *Hortus Kevenfis*, all green-house plants, except the last, *corylifolia*, which is an East Indian biennial species.

Pf. pinnata. Wing-leaved Pforalea. Linn. *Sp. Pl.* 1074. Willd. n. 1. Ait. n. 1. Andr. *Repos.* t. 474. (*Spartium africanum*; Riv. *Tetrap. Irr.* t. 5.)—Leaves pinnate, of two or three pair of linear leaflets, with an odd one. Stalks axillary, single-flowered.—Native of the Cape; an old inhabitant of our green-houses, where it flowers in summer. The *stem* shrubby, much branched. *Leaves* alternate, stalked, dark-green, smooth; *leaflets* about an inch long, narrow. *Stipulas* in pairs, ovate, pointed. *Flowers* the size of the laburnum, blue, with white claws.

Pf. bracteata. Oval-spiked Pforalea. Linn. *Mant.* 264. Willd. n. 6. Ait. n. 5. Jacq. *Hort. Schoenbr.* v. 2. 52. t. 224. Curt. *Mag.* t. 446.—Leaves ternate; leaflets obovate, with a recurved point, and besprinkled with pellucid dots. Spike terminal, capitate. Bractæas fringed.—From the same country, and likewise a common green-house shrub, flowering in summer.—Linnæus once made it a *Trifolium*, as Commelin had done before him. The *flowers* are numerous at the ends of the branches. *Standard* violet. *Wings* and *keel* white.

Pf. aphylla. Leafless Pforalea. Linn. *Sp. Pl.* 1074. *Mant.* 450. Willd. n. 9. Ait. n. 7. Jacq. *Hort. Schoenbr.* v. 2. 51. t. 223.—Stem-leaves ternate or simple. Branches leafless. *Stipulas* somewhat imbricated.—From the same country, introduced at Kew by Mr. Masson in 1790. It flowers in June and July. The long leafless scaly *branches* terminate in a longish cluster of several *flowers*, whose *standard* is blue, the other *petals* white.

Pf. bituminosa. Bituminous Pforalea. Linn. *Sp. Pl.* 1075. Willd. n. 21. Ait. n. 14. Sm. *Prodr. Fl. Græc. Sibth.* v. 2. 92. *Fl. Græc.* t. 738, unpublished. (*Trifolium bituminosum*; Riv. *Tetrap. Irr.* t. 14. Dod. *Pempt.* 556. Ger. *Em.* 1187.)—Leaves ternate; leaflets ovato-lanceolate. Footstalks downy, without glands. Spikes capitate, stalked, axillary.—Native of the south of Europe, in stony ground; frequent in Greece and its neighbouring islands. It is one of our oldest and most common green-house shrubs, though not remarkable for beauty. The whole plant when rubbed has a strong bituminous smell. The *flowers* are of a dull blue, with a dark-coloured *calyx*. Their common *stalks* are usually much longer than the *leaves*. This plant appears evidently, by the precise description in Dioscorides, to be his *τριφυλλον*, or Trefoil.

Pf. corylifolia. Hazel-leaved Pforalea. Linn. *Sp. Pl.* 1075. Willd. n. 27. Ait. n. 19. Curt. *Mag.* t. 665. Burm. *Ind.* t. 49. f. 2.—Leaves simple, ovate, somewhat toothed. Spikes ovate.—Native of the coast of Coromandel, hence it requires to be treated as a tender annual, or

biennial, flowering in summer, and readily ripening seed. The habit is herbaceous. *Leaves* two or three inches broad. *Flowers* small and inconspicuous, with a pale purplish *standard*, and darker *wings*, as well as *keel*, forming small, long-stalked, axillary heads or spikes. Dr. Sims, in Curt. *Mag.*, judiciously indicates the great generic affinity of this plant and *Trifolium caruleum*, or Blue Melilot.

PSORALEA, in *Gardening*, comprises plants of the shrubby exotic kind for the green-house and stove, of which the species cultivated are, the winged-leaved pforalea (*P. pinnata*); the prickly pforalea (*P. aculeata*); the oval-spiked pforalea (*P. bracteata*); the hairy pforalea (*P. hirta*); the bituminous pforalea (*P. bituminosa*); the American pforalea (*P. americana*); the hazel-nut-leaved pforalea (*P. corylifolia*); and the annual pforalea (*P. dalea*).

Method of Culture.—These plants are increased by sowing the seeds in the early spring months, on a moderate hot-bed, or in pots, plunging them in it. When the plants have attained three or four inches in growth, they should be planted out into small pots separately, gradually hardening them to the open air, so as to be placed out in it in the beginning of the summer. They are likewise capable of being increased by planting cuttings of the young shoots in the summer months, in pots filled with light earth, plunging them in a moderate hot-bed and covering them close with glasses, watering and shading them well till they have stricken root.

They afford variety among other potted green-house plants.

PSORAS, in *Ichthyology*, a name by which some authors have called a fish of the turdus kind, remarkable for the variety and beauty of its spots, and more usually known by the name lepras.

PSORIASIS, in *Medicine*, *ψωριασις*, a term used by the ancients to express a scaldness and roughness of the eyelids and corners of the eyes, and also a rough and scaly state of the scrotum, attended with great itching. (See Galen de Oculo, cap. 7, and *Definit. Med.*) Dr. Willan, however, in his classification of cutaneous diseases, thought proper to extend the signification of the word to the more general eruptions of a scaly nature, namely, to the dry or scaly tetter, (the *psora* of the same writers,) for the purpose of avoiding the confusion, which the double signification of this term among the ancients, and the misapplication of it to scabies by the moderns, was likely to produce. (See PSORA.) Whence, in the nomenclature of our contemporaries, the

PSORIASIS, or *Scaly Tetter*, is a disease of the skin, “characterized by a rough and scaly state of the cuticle, sometimes continuous, sometimes in separate patches of various sizes, but of an irregular figure, and for the most part accompanied with rhagades, or fissures in the skin.” (Willan on Cutan. Diseases, p. 149.) This tetter is, therefore, very analogous to lepra, and in some cases, indeed, the two diseases run into each other. The lepra differs, however, in general, by its oval or circular figure, its elevated border, and large scales; whilst the psoriasis has no regularity of form, is more scurfy, is often intermixed with chaps, and usually attended with some disorder of the constitution. Similar distinctions were pointed out by the Greek writers between the lepra and psora. Paul of Ægina says, “*Lepra* affects the skin deeply, in circular patches (*κυκλωσεως*), and throws off scales like those of fishes; but *psora* is more superficial, and variously figured, and throws off bran-like substances.” (Lib. iv. cap. 2.) Actuarius gives a similar statement of the characteristics of the two diseases. The older writers among the moderns have comprised the psoriasis under

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under the appellations of *psora sicca*, *scabies sicca*, and *impetigo*. See Etmüller, Hoffmann, Mercurialis, &c.

In the first edition of his work, Dr. Willan described eight varieties of the psoriasis, which, in his second edition, he extended to eleven, by the addition of some local varieties, affecting the prepuce, eye-lids, &c.

1. The psoriasis *guttata*, in which the eruption appears in very small, separate patches, of an irregular form, seldom exceeding two or three lines in diameter, may be deemed a sort of connecting link between this genus and lepra. The little patches have not the regular oval or circular margin of lepra, nor the elevated border of that disease, and the scales which form upon them are thinner, and separate in smaller fragments, and, when detached, they leave a less inflammatory, though somewhat red and polished, base. There is scarcely any part of the body on which the patches do not appear, not excepting even the face, which is rarely the seat of lepra; but in the latter situation, they exhibit only a redness and roughness, without any actual scales. In children, the eruption often appears suddenly, accompanied by some degree of febrile irritation, and spreads rapidly over the body: but in adults its progress is gradual and slow, and it is apt to return in the spring season for several successive years, preceded by head-ache, and pains in the stomach and limbs.

2. The psoriasis *diffusa* presents a considerable variety of appearances. In most cases it consists of large patches, which are irregularly circumscribed, and exhibit a rough, red, and chapped superficies, with very slight scaliness interspersed. This surface is often exceedingly tender and irritable, and is attended with a sensation of burning and intense itching, both of which are much augmented by approaching a fire, on becoming warm in bed, or even on exposure to the direct rays of the sun; but they are relieved by the impression of cool air. As the disorder proceeds, the redness increases, and the skin appears thickened and elevated, with deep intersecting lines or furrows, which contain a powdery substance, or very minute scurf. The heat and painful sensations are much aggravated by the least friction, which also produces excoriation, and multiplies the sore and painful rhagades. This form of the disease is most frequent about the face and ears, and the back of the hands; but occasionally occurs on other parts of the body, either at the same time or in succession, as in the forehead and scalp, the shoulders, back, loins, and abdomen, on the fleshy parts of the lower extremities, the outside of the fore-arm, and the instep. When the scales are removed by frequent washing, or by the application of ointments, the surface, though raised or uneven, appears smooth and shining, and crossed with deep furrows. Should any portion of the diseased surface be forcibly excoriated, a thin lymph issues out, mixed with some drops of blood, which slightly stains and stiffens the linen, but soon concretes into a thin dry scab: this is again succeeded by a white scaliness, gradually increasing, and spreading in various directions. As the eruption declines, the roughness, chaps, scales, &c. disappear, and a new cuticle is formed, at first red, dry, and shrivelled, but which, in two or three weeks, acquires the proper texture. The whole duration of the complaint is from one to four months, and in some cases much longer.

On the first appearance of psoriasis *diffusa*, the constitution is usually somewhat disordered; there is a feeling of universal languor and debility, with loss of appetite, head-ache, pain or sickness at the stomach, and pains in the limbs. During the progress of the eruption these symptoms are diminished, or cease altogether; but the eruption is apt to return at particular seasons, and each return is usually pre-

ceded by the same symptoms. The disease is often confined to a solitary patch, of an irregular form, red, scaly, chapped, and itching, situated on the face, the breast, calf of the legs, about the wrist or elbow, and especially about the lower part of the thigh behind. In any of these situations, it continues several months with little alteration. The eruption called the *baker's itch*, which occurs on the back of the hand in bread-bakers, is the psoriasis *diffusa*, and consists at first of one or two small, rough, scaly patches, which extend and coalesce, reaching from the knuckles to the wrist. Washerwomen are also subject to a peculiarly severe form of this psoriasis, on the hands, wrists, and fore-arms, apparently from the irritation of soap. From the whole of the surface, which is highly inflamed, the scaly and brittle cuticle separates in large irregular flakes in rapid succession.

3. Psoriasis *gyrata*. In this form of the disease, the tetter is distributed in narrow patches or stripes, of various figures; some of them are nearly straight, some circular, or semicircular, with worm-like extremities, and some are tortuous or serpentine, resembling earth-worms or leeches. The arrangement of these patches is singular, often regularly corresponding on both sides of the chest or spine. A slighter variety of this tetter affects delicate young women and children, in small scaly circles, slightly discoloured, on the cheeks, neck, and upper part of the breast, which are sometimes called ringworms.

4. The psoriasis *palmaria*, a very obstinate species of tetter, is nearly confined to the palm of the hand. It commences with a small, harsh, or scaly patch, which gradually spreads over the whole palm, and sometimes appears in a slighter degree on the inside of the fingers and wrist. Its colour often changes to a dirty hue, which the most diligent washing does not alter. The cuticular furrows are deep, and cleft at the bottom in various places, so as to bleed on stretching the fingers. There is usually a sensation of heat, pain, and stiffness in the motion of the hands, and often a troublesome itching, especially on the returns or aggravations of the eruption. It is most troublesome in the winter and spring; in summer and autumn it sometimes disappears, leaving a soft dark red cuticle; but many persons have it for a series of years, with only very slight remissions. Shoemakers are subject to this complaint from the irritation of the wax which they constantly employ; and braziers, tinmen, silversmiths, &c. seem to suffer by it from handling cold metals. But it is often produced without any very obvious irritation; and a scaliness of the soles of the feet, but without chaps, occasionally concurs with the affection of the hands.

5. Psoriasis *labialis*. The lips are sometimes affected with scaliness, intermixed with chaps and fissures of the cuticle, when the other parts of the body are free from psoriasis. The scales that form on the lips are of a considerable magnitude, so that their edges are often loose while the central points are attached: a new cuticle gradually forms beneath the scales, but it is not durable; in the course of a few hours it becomes dry, shrivelled, and broken, and while it exfoliates, gives way to another layer of tender cuticle, which soon, in like manner, perishes. These appearances should be distinguished from the slight chaps and roughness of the lips, produced by very cold or frosty weather, and which are easily removed. The psoriasis *labialis* may be a little aggravated by frost or sharp winds, yet it receives no material alleviation in warm weather: it continues in many cases, indeed, through all seasons. The under lip always suffers more than the upper; and the disease especially affects persons whose lips are full and prominent.

6. Psoriasis *ophthalmica*. This affection begins about the
4 X 2 external

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external angles of the eyes, producing a bright redness of the skin, with a smooth, shining, and somewhat moist surface; and the edges of the eye-lids near the angles become thickened and rigid, and somewhat inflamed, with considerable itching.

7. The psoriasis *præputii* often accompanies the psoriasis *palmaria*. It is characterised by a scaldiness, with painful fissures and thickening of the prepuce. These symptoms, being usually attended with a phymosis, render connubial intercourse difficult, or even impracticable. In some cases, both internal medicines and external applications disappoint our expectation, and the patient can only be relieved by circumcision. This complaint should be carefully distinguished from the venereal phymosis, in which scales and fissures of the skin do not occur.

8. Psoriasis *scrotalis*. Sometimes the skin of the scrotum is affected with roughness and scaldiness, together with much heat, itching, tension, and redness, independently of any similar affection in other parts of the body. The symptoms are succeeded by a hard, thickened, brittle texture of the skin, and by painful chaps or excoriations, which are not easily healed. The itching and irritation are much increased by changes of temperature, especially on undressing, or getting into bed. The disease sometimes appears to be the sequel of the prurigo scroti.

9. Although the nails are generally affected only in conjunction with the tetter of the hands and arms, yet occasionally a psoriasis *unguium* occurs alone, when the nails are bent either upwards or downwards at their extremities, and are either rough and ragged, or thickened and deeply furrowed, and of a brown or yellowish hue.

10. The psoriasis *infantilis*, which occurs under the age of two years, does not differ materially in its appearances from the psoriasis *diffusa*, but Dr. Willan marked it as a variety, because it is sometimes succeeded by inflamed and suppurating pustules, and because it is not easily distinguishable from the scaly disease which occurs in infants from venereal infection. The nature of it can only be determined by taking into consideration the collateral circumstances.

11. The last variety described by Dr. Willan is the psoriasis *inveterata*, the most severe modification of the complaint, beginning in separate irregular patches, which multiply and become confluent, until they extend over all the surface of the body, except a part of the face, or sometimes the palms of the hands and soles of the feet, producing at length an almost universal scaldiness, interspersed with deep furrows, and a harsh and thickened state of the skin, which is red, stiff, and rigid, impeding the motion of the joints. The production and separation of scales is so rapid, that large quantities are found in the bed in which the patient has slept. Sometimes the eruption becomes extensively inflamed, and even excoriated, discharging lymph, after which a dry, hard, and horny cuticle is formed, which separates, not in scales, but in large pieces. The nails, both of the fingers and toes, become thickened, convex, and opaque, and are at intervals renewed, but the new ones soon assume the same morbid form. The disease often continues, with indeterminate remissions and exacerbations, for a long period of time, especially in old people, but sometimes even occurs in the young. It results occasionally from repeated attacks of the psoriasis *diffusa*; and has sometimes followed the prurigo *senilis*.

The causes of psoriasis are by no means obvious in general. It is not contagious, as asserted by some of the older writers, unless the appearance of the small circles in children of the same family or school, can be considered as a proof of contagion in these cases. The other forms of the disease were never seen to spread by contagion. A strong hereditary

disposition to it is certainly manifest in some individuals. Dr. Falconer, in his paper on the lepra græcorum, in which he includes also the scaly tetter (see Memoirs of the Med. Society of London, vol. iii.), ascribes it, in many instances, to sudden chills, from drinking cold water after being violently heated by exercise, a cause to which many other eruptive diseases have been imputed. Women, and especially those of a sanguineo-melancholic temperament, are most liable to it, having a dry skin and languid circulation; and it affects them more particularly after parturition, or during a state of chlorosis. Dr. Willan had observed it occasionally in both sexes, connected or alternating with gouty rheumatic affections; and we have sometimes seen it occur under a state of great mental anxiety, grief, or apprehension. In those who are constitutionally predisposed to this eruption, indeed, slight occasional causes seem to be capable of producing it; such as being overheated by exercise, the unseasonable use of the cold-bath, a copious use of acid fruits, vinegar, or crude vegetables, and some incongruous mixtures of food.

Treatment of Psoriasis.—The same general mode of treatment is applicable to the different modifications of the disease, but especially to the three first species, which are not limited to particular parts. The popular practice, which is much the same as that which was recommended by Willis above a century ago, is founded upon the old humoral pathology, and consists chiefly in attempts to expel imaginary humours by evacuants, or to correct them by what are called antiscorbutics. But experience has proved, that a system of blood-letting and of repeated purging is injurious, and that the vegetable juices and acids are not merely void of all efficacy, but absolutely prejudicial. In fact, the erroneous notion, that these tetter, and most other cutaneous affections, are of a *scorbutic* nature, seems alone to have led to the use of these medicines. A more recent empiricism, which resorts to mercury in all diseases of a chronic nature, and of some obscurity of character, is not more successful; for from the time of Willis (de Med. Operat. p. 292.) the inefficacy of a mercurial course, whether internal or by external friction, has been acknowledged by all observing practitioners. Dr. Willan says, that, from many experiments cautiously made, he was well assured that strong mercurial preparations are of no advantage in the scaly tetter, but eventually rather aggravate the complaint. Chalybeate waters, such as those of Scarborough and Tunbridge, and chalybeate medicines generally, appear to have no direct remedial operation in this disease, but are sometimes secondarily useful by improving the constitution.

In the commencement of psoriasis, especially under the three first varieties, and when it appears suddenly in connection with febrile symptoms, a moderate antiphlogistic treatment must be pursued. A gentle purgative should be administered, and the diet made light, by abstracting every thing stimulant. This regimen is, indeed, necessary throughout the course of the disease, which is immediately aggravated in sympathy with irritation of the stomach, whether by spices, fermented and vinous liquors, pickles, &c. But when the constitutional disturbance has subsided, the use of the fixed alkali, with sulphur lotum, together with tepid washing with simple water, or milk and water, will be beneficial. If the scaly patches have extended over a considerable part of the body, or the disease have assumed the inveterate form, it must be considered in a similar light with the lepra vulgaris, and treated by the medicines recommended for that disease. (See LEPROSY of the Greeks.) It is very difficult by any local applications to give the patient relief from the shooting and burning pain and itching, which he anxiously

looks for : he is mortified to find that even the mildest substances often prove irritants, and aggravate his distress. A decoction of bran, a little cream, or oil of almonds, sometimes produce ease.

But the more local and less inflammatory eruptions of psoriasis not only bear, but require local expedients. In the psoriasis *palmaria*, the same internal medicines are proper, as in the other forms of the disease : but the heat, dryness, and itching of the palms, are relieved by holding them for some time every night in the vapour of hot water, and afterwards putting on gloves made of oiled silk, and by applying the unguentum hydrargyri nitrati, diluted with some mild ointment, according to the degree of irritation in the skin. Sea-bathing, continued for many weeks, is generally an effectual remedy.

In the psoriasis *labialis*, the same temperate regimen is particularly necessary, and remedies for the correction of disordered stomach should likewise be prescribed. All acrid applications should be avoided, as uniformly detrimental to the lips, which should be kept almost constantly covered with some mild ointment or plaister, that they may not be influenced either by heat or cold. To the psoriasis *ophthalmica* and *scrotales*, the diluted ointment just mentioned may be applied with advantage ; but in the latter complaint, besides this application and the use of general remedies, great care is requisite to keep the parts clean by frequent ablution with warm water, gruel, &c., and to prevent attrition by the constant use of the ointment. In the psoriasis *unguium*, the nails may be immersed from time to time in warm water, and cut smooth. The complaint, however, is more likely to be removed by sea-bathing, and other remedies which act on the constitution, than by any local application. See Willan on Cutaneous Diseases, p. 149, &c. ; Bateman's Practical Synopsis of Cutan. Diseases, p. 36.

PSORICA, ψωριζα, medicines good against the itch, scabs, and other cutaneous eruptions, especially those of the eye-lids.

PSORICE, or PSORICE-Ροα, a name given by the botanical writers among the ancient Greeks to the plant we call *scabiosa*, or *scabious*.

PSOROPHTHALMIA, ψωροφθαλμια, from ψωρος, and οφθαλμια ; *scabies oculi* ; *lippitudo scabra* ; *oculi psoriasis*. Psorophthalmia, in *Surgery*, means a disease of the eye-lids, which consists of an inflammation and ulceration of their internal membrane near their edges, attended with a discharge of acrid purulent matter. In order to have an accurate idea of psorophthalmia, one must recollect, that both the tarfi have on their inner surfaces several perpendicular rows of sebaceous glands, the excretory ducts of which terminate just within the internal margin of each cartilage, where they pour out an unctuous kind of secretion, commonly known by the name of the humour of Meibomius. It is these glands which are particularly affected in psorophthalmia ; the matter which they are accustomed to secrete, instead of being soft and bland, becomes acrid and adhesive, producing a substance which is usually called gum, and which irritates the eye and eye-lids, causes ulceration of the edges of the latter parts, and thus keeps up the disease for a very long time. Monsieur St. Yves, in treating of the ophthalmia, which is occasioned by the small-pox, has drawn up one of the most correct descriptions of psorophthalmia, which is any where extant.

Psorophthalmia frequently follows inflammation of the eye, and sometimes accompanies all its stages. This is very common in scrofulous subjects, and patients troubled with herpetic disorders. But, occasionally, psorophthalmia is the consequence of that purulent affection of the eye-lids,

to which the Greeks have given the name of σ'ιον. In psorophthalmia, the ulceration is ordinarily confined to the edge of the eye-lids ; but, in particular instances, it extends much further over their outer surface, and even over the cheeks, which are excoriated, and have an erysipelatous appearance. It is also sometimes accompanied with an eversion, or true ectropium of the lower eye-lid, in which circumstance the case proves exceedingly obstinate. The ancients, and even several of the moderns, have detailed different affections, which bear considerable resemblance to those which have just now been mentioned ; but they have regarded them as depending upon some constitutional disease, which requires removal, and which, being cured, is always followed by the relief of the symptomatic complaint of the eyes. Where other symptoms exist, shewing a foundation for the suspected disease of the habit, the previous doctrine may be really true ; but when no symptoms of this kind prevail, it may lead to very erroneous practice. The ulceration of the ciliary glands in psorophthalmia, may be seen not only with a magnifying glass, but even with the unassisted eye, when the eye-lids are everted. The matter poured out from them is of an irritating quality, and, when dry, forms gummy incrustations, which glue the eye-lids together. When psorophthalmia is accompanied with symptoms, evincing that the disorder is combined with disorder of the system, the first indication is to endeavour to amend the state of the constitution.

Scrofula is the disease with which psorophthalmia is most apt to be conjoined, and, in this case, it is necessary to prescribe such general remedies as are found to be most effectual for scrofula, at the same time that topical applications are employed. Baron Stork spoke highly of the extract of cicuta ; in confirmation of its efficacy, he relates twenty cases, in which this medicine was at first exhibited in the dose of two grains twice a-day, which dose was afterwards increased to three grains, administered three times every twenty-four hours. In the third volume of the Medical Observations and Inquiries, Dr. Fothergill published some remarks on the effects of cicuta, which, while it is described as being an useful medicine, is acknowledged to be sometimes unavailing. This practitioner had already extolled the efficacy of bark in cases of inveterate ophthalmia, and he has betrayed a partiality to it ; for it was his common practice invariably to prescribe it, in conjunction with calomel pills. In certain cases, mercurials and purgatives bring the constitution into a state, in which the disease of the eye-lids may readily be cured by means of suitable applications.

Before the true character of psorophthalmia was well understood, the generality of oculists applied emollient substances, as mucilage of quince-seeds, cream, fresh butter, &c., or mildly astringent ointments, which were put on the edges of the eye-lids, in order to prevent them from becoming adherent together. In this manner, they succeeded in softening the scabs and making them fall off ; but others soon formed, and thus the disorder went on. Some of the old practitioners, however, ventured to make use of stronger applications. Rhazes recommends a stimulating collyrium to be applied to the ulcerated eye-lids ; and the celebrated oculist, St. Yves, was an advocate for touching the fore part of the eye-lids with the lapis infernalis. "J'ai trouvé (says he) qu'en touchant ces ulcères avec la pierre infernale, ils se cicatrisoient aisément. Il faut en ôter l'ardeur aussitôt qu'elle les a touché en faisant baigner l'œil plusieurs fois dans un petit verre d'eau ; et il faut surtout prendre garde que l'endroit de la paupière sur lequel on a appliqué la pierre ne pose point sur le globe de l'œil, que la cuisson qu'elle

qu'elle a caufée, n'en foit paffée. On les touchera une ou deux fois la femaine, jufqu'à ce qu'on juge que ce foit affez, et on met fur ces endroits foir et matin de la tuthie en poudre très fine, qui achenera de les cicatrifer."

The application of cauftic, in the manner advifed by St. Yves, is liable to objections, and the practice, when inconfiderately adopted, has done mischief. A fafer topical application, for fulfilling the fame indication, confifts of an ointment, compofed of twenty-four grains of red precipitate, incorporated with two drachms of white falve. Some of this is to be tenderly put on the edges of the difeafed eye-lids.

But of all the topical remedies for pforophthalmy, none have gained fo much repute as the unguentum hydrargyri nitrati, which was brought into notice in this cafe by the eminent Mr. Ware. He direfts a little of this ointment to be melted, and rubbed with the end of the fore-finger, or the point of a fmall camel's-hair brush, into the edges of the affected eye-lids, every night, at bed-time. A plafter of ceratum album is then to be put over the eye-lids, in order to prevent them from sticking together. If, notwithstanding this method, they fhould yet be found to adhere to each other in the morning, Mr. Ware advifes cleaning them with milk and butter well mixed together. In a few examples, where the fmall-pox has occafioned ulcers on the edges of the eye-lids, it is neceffary to have recourfe to the argentum nitratum. When the inflammation extends to the globe of the eye, the thebaic tincture is to be employed as a topical application, as mentioned in the article OPTHALMY.

Pforophthalmy is a complaint that is particularly apt to recur; and hence it is frequently indifpenfible to obferve, for fome time after the cure, a proper regimen, and to continue a courfe of alterative medicines. See L'Encyclopédie Méthodique, Partie Chirurgicale, art. Pforophthalmie; Ware on Ophthalmy, &c. &c.

PSUCHAGOGICA, formed of $\psi\upsilon\chi\eta$, *anima*, and $\alpha\gamma\omega$, *duco*, a word ufed by the ancients to exprefs fuch medicines as were ufed in apoplexies and faintings, to recall life.

PSUCHROTROPHON, in the *Materia Medica of the Ancients*, a name given to a plant often recommended, but not perfectly underftood as to what fpecies it means. It is the fame plant called *cestrum* by the Greeks, and has this firft name only becaufe of its growing in moift places; the word being formed of the Greek $\psi\upsilon\chi\epsilon\sigma$, *moift*, and $\tau\epsilon\sigma\epsilon\iota\upsilon\upsilon$, *to nourifh*, or *caufe to grow*.

PSYCHOLOGY, $\Psi\upsilon\chi\omicron\lambda\omicron\gamma\iota\alpha$, formed from $\psi\upsilon\chi\eta$, *soul*, and $\lambda\omicron\gamma\omicron\varsigma$, *discourfe*, the doctrine of the foul.

Anthropology, or the fcience which confiders man, confifts of two parts: the firft treating of the body, and the parts belonging to it, called *anatomy*; and the fecond of the foul, called *psychology*.

PSYCHOMANCY, formed of $\psi\upsilon\chi\eta$, *soul*, and $\mu\alpha\upsilon\tau\epsilon\iota\alpha$, *divination*, a kind of magic or divination, performed by raifing the fouls of perfons deceafed.

PSYCHOTRIA, in *Botany*, a name altered by Linnæus from the *Psychotrophum* of Browne, which alludes to the fhady place of growth of moft of the fpecies. $\Psi\upsilon\chi\omicron\tau\omicron\phi\omicron\nu$ is an ancient name for an herb loving fhade.—Linn. Gen. 92. Schreb. 125. Willd. Sp. Pl. v. 1. 961. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 373. Swartz Ind. Occ. v. 1. 390. Juff. 204. Lamarck Illuftr. t. 161. Gærtn. t. 25. (Psychotrophum; Browne Jam. 160. t. 13. f. 1.)—Clafs and order, *Pentandria Monogynia*. Nat. Ord. *Stellate*, Linn. *Rubiaceæ*, Juff.

Gen. Ch. *Cal.* Perianth fuperior, very fmall, five-toothed, permanent. *Cor.* of one petal, falver-shaped; tube long; limb fhort, in five, nearly ovate, acute fegments.

Stam. Filaments five, capillary; anthers linear, erect, not rifing above the mouth of the tube. *Pift.* Germen inferior, roundifh; ftyle thread-fhaped; ftigma in two rather thick blunt fegments. *Peric.* Berry globular, of two cells, crowned with the calyx. *Seeds* folitary in each cell, hemifpherical; flat on the inner fide; convex, with five furrows, on the outer.

Eff. Ch. Calyx five-toothed, crowning the globular berry. Seeds two, hemifpherical, furrowed. Corolla tubular.

An extenfive genus of, chiefly Weft Indian, shrubby plants, with fimple oppofite leaves, fheathing intrafoliaceous membranous ftipulas, and copious, fmall, whitifh, paniced or corymbofe, axillary or terminal, flowers. They are generally fmooth, growing in dry bufhy hilly places. Their qualities have not been much investigated, though the not very remote affinity of the genus to *Cinchona*, and its nearer approach to *Coffea*, might induce a fuppofition of their not being altogether unimportant. Only two fpecies, the *afiatica* and *herbacea*, are mentioned in the *Species Plantarum* of Linnæus, but the difcoveries of Aublet and Swartz have greatly enriched this genus, fo that thirty-nine fpecies occur in Willdenow. Four of them are cultivated at Kew, but fcarcely known in other collections. The following examples may fuffice.

Pf. *citrifolia*. Citron-leaved Psychotria. Swartz Ind. Occ. 398. Willd. n. 8. Ait. n. 1.—Stipulas ovate, permanent. Leaves elliptical, pointed, fomewhat coriaceous, very fmooth. Panicles fhorter than the adjoining leaves. Berries oblong, ribbed.—Found by Mr. Alexander Anderfon, in the Weft Indies; introduced at Kew by Capt. Bligh in 1793. It is kept in the ftove, but has not yet flowered. A fmall tree, with a fmooth bark; the branches oppofite, flightly compressed. Leaves ftalked, contracted at the bafe, from three to fix inches long, ribbed, veiny, of a fine fhining green. Stipulas ovate, pointed, rigid, permanent. Flowers rather large, whitifh, in repeatedly three-forked panicles. Segments of the corolla villous. Berry furrowed, crowned with the fmall obtufe calyx. Seeds enveloped in a tunic.

Pf. *nitida*. Wild-cows' Psychotria. Willd. n. 9. (Mapouria guianensis; Aubl. Guian. v. 1. 175. t. 67.)—Stipulas roundifh-ovate, deciduous. Leaves broadly elliptical, pointed. Panicle terminal. Limb of the corolla longer than its tube.—Found by Aublet about rivers in Guiana, flowering in September. The stems are shrubby, brittle, full of pith, feven or eight feet high. Leaves fometimes eight inches long and four broad, of a fhining green, pliable, with large deciduous ftipulas. Flowers fmall, white, in terminal panicles. The inhabitants call the plant *Maypouricrabri*, becaufe the *Mapouris*, or Wild Cows, are very fond of feeding on its leaves and branches. Hence Aublet, who thought it a new genus, conftituted the name of *Mapouria*.

Pf. *parasitica*. Parasitical Psychotria. Swartz Ind. Occ. 408. Willd. n. 16. Ait. n. 2. (Viscoides pendulum; Jacq. Amer. 73. t. 51. f. 1.)—Stipulas abrupt, clafping the item. Leaves ovate, pointed, veinlefs, rather fucculent. Clusters compound; terminal and axillary.—Native of mountainous woods, in feveral of the Weft Indian iflands, where it grows for the moft part parasitically, on the trunks of aged trees. The stem climbs, throwing out feveral pendulous leafy branches. Leaves ftalked, about an inch and a half long, rather curved, bright green, fmooth; paler beneath. Flowers few, fmall, white. Corolla downy at the orifice.

Pf. *involutrata*. Athma Psychotria. Swartz Ind. Occ. 413. Willd. n. 20. (Nonatelia officinalis; Aubl. Guian.

Guian. 182. t. 70. f. 1.)—Stipulas with two teeth.—Leaves ovato-lanceolate, polished. Clusters terminal, corymbose; their partial stalks three-flowered. Bractees of three linear leaves.—Native of barren places, by way sides, in Guiana and Cayenne, flowering and fruiting in August. *Aublet*. It is said also to be found in Jamaica. The shrubby stem is two or three feet high, with smooth knotty branches. Leaves about two inches long, tapering at each end. Stipulas with a pair of awl-shaped teeth at each side. Flowers small, white. Berry black, the size of a red currant, with ten furrows. Aublet says it has five cells, with a seed in each, and hence he established his genus *Nonatelia*; but Swartz, from an examination of original specimens, assures us this is a mistake, the *Nonatelia* of Aublet being true *Psychotria*. The species of which we are speaking is said to be in some degree aromatic, when dried or bruised. An infusion of the leaves is esteemed useful in the asthma.

Pf. *herbacea*. Herbaceous Psychotria. Linn. Sp. Pl. 245. Willd. n. 29. Ait. n. 4. Jacq. Amer. 66. t. 46.—Stem herbaceous, creeping. Leaves roundish-heart-shaped, stalked, obtuse.—Native of the West Indies; said to blossom in the stove at Kew, from April to June. The stem is thread-shaped, creeping close to the ground, sending down many tufts of fibrous radicles, and throwing up, here and there, a simple, erect, herbaceous stem, three or four inches high, bearing two pair of opposite long-stalked leaves, and a few terminal, corymbose, bracteated, white flowers. Berries globose, even, red.—Jacquin says this species grows abundantly in moist shady parts of Martinico, bearing flowers, as well as plenty of ripe fruit, in December.

Pf. *emetica*. Emetic Psychotria. Linn. Suppl. 144. Willd. n. 30. (Ipecacuanha; Pif. Bras. 101? Marcgr. Bras. 17?)—"Stem herbaceous, procumbent. Leaves lanceolate, smooth. Stipulas awl-shaped, extrafoliaceous. Heads axillary, stalked, of few flowers."—Native of the province of Girona, in the hottest part of North America, by the governor of which it was sent to Mutis, who communicated a description, but as far as we can discover, no specimen, of the plant to Linnæus, supposing it one kind at least of Ipecacuanha. The root is perpendicular, roundish, somewhat branched. Leaves crowded. Stipulas deciduous. Flowers axillary, white, stalked, from two to five on each stalk. Berry nearly ovate. We have never seen this species.

PSYCHOTROPHUM, Browne Jam. 160. t. 13. f. 1. See PSYCHOTRIA.

PSYCHROLUSIA, formed of ψυχρός, cold, and λουω, I wash, a word used by medical writers to express cold bathing.

PSYCHROMETER, formed from ψυχρός, cold, and μέτρον, measure, an instrument for measuring the degree of coldness of the air; more usually called a thermometer.

PSYCTICA, formed of ψυχρός, I cool, a term used by medical writers to express cooling remedies.

PSYDRACIA, in Medicine, ψυδρακία, pustules mentioned by the ancient writers, which, according to Gorræus, were of a cold nature, "quasi ψυδρα ιδρακία, id est, frigida seu frigefactæ guttula." Whence Dr. Willan, in the definitions prefixed to his treatise on "Cutaneous Diseases," adopted the term in opposition to phlyzacia, or hot pustules, to designate the minute pustules, which produce but a slight elevation of the cuticle, and have little inflammation at their base. The psydracia were enumerated among the eruptions peculiar to the head by Alexander and Paul, and some other Greek physicians; but Galen and others mention them as common to other parts of the

body. See Gorræus, Definit. Med.; and Bateman's Synopsis of Cutan. Diseases, p. 21.

PSYGMATA, derived from ψυχρός, I cool, a name given by physicians to all refrigerating medicines, external and internal.

PSYLLI, in Ancient Geography, inhabitants of Cyrene, and other parts of Cyrenaica (which see), situated between the Nafanones and the Gætuli. Their territory abounded with serpents, against the bite of which they were provided, according to Strabo, with a secret antidote, by the use of which, as well as by eating the serpents, they amused the credulity of observers. Savary (Letters in Egypt, vol. i.) informs us, that these serpent-eaters still exist in our days. In a procession at Rosetta, which drew together a large concourse of people, the chiefs, or priests of the country, were followed by a band of seeming madmen, with their arms bare, and a wild look, holding in their hands enormous serpents, which were twisted round their bodies, and were endeavouring to make their escape. These Pfylli griping them forcibly by the neck, avoided their bite, and notwithstanding their hissing, tore them with their teeth, and ate them up alive, the blood streaming down from their polluted mouths. Others of the Pfylli were striving to tear from them their prey; so that it seemed to be a struggle among them who should devour a serpent. The populace followed them with amazement, and believed their performance to be miraculous. Accordingly they pass for persons inspired, and possessed by a spirit who destroys the effect of the serpent.

PSYLLIUM, or PSYLLA, a town of Asia Minor, in Bithynia, on the northern coast, according to Ptolemy, between Heraclea Pontæ and Tion.

PSYLLIUM, in Botany, ψύλλιον of the ancient Greeks, so denominated from ψύλλα, a flea, in allusion to the appearance of its little brown, shining, and slippery seeds. See PLANTAGO.

PSYLON, in Ichthyology, a name given by Aristotle, and many others of the old Greek writers, to the tench, or cyprinus niger.

PSYRA, in Ancient Geography, an island of the Ægean sea; N.W. of and near the promontory Melæna, in the isle of Chios.

PSYRA, in Geography, a small island in the Grecian Archipelago, situated W.N.W. of the island of Scio. N. lat. 28° 36'. E. long. 25° 39'.

PSYTALIA, in Ancient Geography, an island of the Saronic gulf, S.E. of Salamine. After the battle of Salamine the Greeks made a descent on this island, and massacred several bodies of Persian troops. In the time of Pausanias, this island contained several statues of Pan.

PTARMICA, Πταρμικα, formed of πταρμός, sneezing, medicines proper to promote sneezing; more usually called *errhines* and *sternutatories*.

PTARMICA, in Botany, πταρμικη of the Greeks, so called from πταρμός, sneezing, because of its effects. (See ACHILLEA.) Both *A. Ptarmica*, and the much more common *A. Millefolium*, have a power of causing sneezing, by means of the minute prickles which border their leaves, and which irritate the nostrils when introduced therein with a slight degree of violence. If a blow be given externally while the nostril is thus stuffed, these prickles are found sufficient to wound the small blood-vessels, and to cause a bleeding at the nose.

PTARMIGAN, the lagopus of Pliny, and the tetrao lagopus of Linnæus, in Ornithology, is also called the *white game*, and erroneously the white partridge. This bird is of a pale brown or ash-colour, elegantly crossed or mottled with

with small dusky spots, and bars, the head and neck with broad bars of black, rust-colour, and white; the wings are white, but the shafts of the greater quill-feathers black; and the belly white. In the male, the grey colour predominates, except on the head and neck, where there is a great mixture of red, with bars of white. The females and young birds have a great deal of rust-colour. Both agree in their winter-dress, being entirely white: except that in the male a black line occurs between the bill and the eyes: the shaft of the seven first quill-feathers is black; the tail consists of sixteen feathers; the black feathers being covered by two upper ones, which in summer are brown, and in winter white.

These birds are called by Pliny *lagopi*, because their feet are clothed with feathers to the claws, as the hare's are with fur, which serves to guard them from the rigour of the winter: the nails are long, broad and hollow, scooped off at the end exactly like a writing-pen, without the slit, which enables them to form a lodgment under the snow, where they lie in heaps to protect themselves from the cold. Their length is near fifteen inches, the extent twenty-three; and the weight nineteen ounces. They are found in these kingdoms only on the summits of the highest hills of the Highlands of Scotland and of the Hebrides; and some few are found on the lofty hills near Keswick, in Cumberland. They resemble the grouse in taste, and, like them, keep in small packs, but never, like those birds, take shelter in the heath, but beneath loose stones.

In Hudson's Bay, this bird is called the willow partridge: they gather together in large flocks in the beginning of October, harbouring among the willows, the tops of which are their principal food. They then change to their winter dress; change again in March; and have their complete summer dress by the latter end of June. They make their nest in the ground in dry ridges, and are so plentiful, that ten thousand have been killed in the three forts in one winter. Pennant's Brit. Zool. vol. i. p. 272, &c. Phil. Transf. vol. lxxiii. part ii. art. 28. See GORCOCK.

PTELEA, in *Botany*, πτελεα, the Greek name for an Elm, is adopted by Linnæus for a new American genus, whose fruit bears a considerable resemblance to that of *Ulmus*.—Linn. Gen. 60. Schreb. 680. Willd. Sp. Pl. v. 1. 670. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 1. 264. Pursh 107. Juss. 375. Lamarck Illustr. t. 84. Gært. t. 49.—Class and order, *Tetrandria Monogynia*. Nat. Ord. *Tribilata*, Linn. *Terebintaceæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, small, in four deep acute segments, deciduous. *Cor.* Petals four, ovato-lanceolate, spreading, flat, coriaceous, larger than the calyx. *Stam.* Filaments four, awl-shaped, erect, hairy, when perfect nearly as long as the corolla; anthers roundish. *Pist.* Germen superior, orbicular, compressed; style short, compressed; stigmas two, divaricated, bluntish. *Peric.* Drupa dry, membranous, veiny, orbicular, compressed, with a dilated margin of two cells. *Seeds* solitary, oblong, tapering upward.

Eff. Ch. Petals four. Calyx inferior, in four deep segments. Stigmas two. Drupa roundish, compressed, dry, membranous, of two cells. Seeds solitary.

Obs. Linnæus originally confounded with this genus what he afterwards called *Dodonæa*. His son referred to it Forster's *Blackburnia*. Some curious observers in Germany, having found the stamens imperfect on one tree and the pistil on another, removed *Ptelea* to *Dioecia*; but Willdenow more correctly says the genus is polygamous, being merely liable to occasional imperfection in one or

other of the organs of impregnation, the rudiments, at least, of both sexes being found in every flower.—One species only is now admitted.

P. trifoliata. Shrubby Trefoil. Linn. Sp. Pl. 173. Mill. Ic. t. 211. (*Dodonæa trifoliata*; Trew Rar. 12. t. 9. *Frutex virginianus trifolius, ulmi samaris*; Dill. Elth. 147. t. 122. f. 148.)—Native of shady moist hedges, and the edges of woods among rocks, from New York to Carolina, according to Mr. Pursh; flowering in June. It appears to have been known in the beginning of the last century to the British cultivators of curious shrubs, and still keeps its place in shrubberies, rather for the sake of variety than beauty, flowering about Midsummer and afterwards. It often forms a small tree, with spreading branches. The leaves are deciduous, alternate, stalked, each of three, rarely five, ovate irregularly serrated leaflets, about two inches long. Flowers terminal, small, corymbose, copious, of a greenish-white. They are often five-cleft and pentandrous.

Blackburnia, Forst. Gen. t. 6, is supposed to differ generically in having a simple stigma, as well as a single-seeded berry. Its ripe fruit however has not been observed.

PTELEA, in *Gardening*, contains a plant of the shrubby kind, of which the species is the three-leaved ptelea, or shrubby trefoil (*P. trifoliata*.)

There is a variety of this with five leaves.

Method of Culture.—This plant may be increased by seeds, cuttings, and layers.

The seeds should be sown in the early spring months, as March, in pots filled with light rich mould, plunging them in a moderate hot-bed to bring up the plants, giving them occasional waterings during the summer season, and protecting them during the winter from severe frost, planting them out in the following spring in nursery-rows, to get strong for being finally planted out.

The cuttings should be made from the young shoots, and planted in pots filled with light earth in March, plunging them in a hot-bed to strike them, but they should not have much heat, due shade being given. They readily strike root, and may be planted out the following autumn.

The layers may be laid down in the autumn, choosing the young shoots for the purpose, giving them a slit underneath, and then placing them in the soil. They are mostly rooted in the course of a twelvemonth.

These plants are proper for shrubberies, and other places in pleasure-grounds, where they have a very ornamental effect.

PTELEUM, in *Ancient Geography*, a town of Theffaly, in the Phthiotide, at the entrance of the Pelagic gulf, and very near it. Homer says that the territory of this town abounded with pasturage. It existed in the time of the war of Perseus. At the approach of the consul P. Licinius, 171 years B. C., the inhabitants fled and abandoned their town, which the consul took possession of and totally destroyed.

PTERANTHUS, in *Botany*, so called by Forskall, from πτερον, a wing, and ανθος, a flower, because, either of the dilated calyx-leaves, or of the broad compressed flower-stalks. See LOUCHEA, and CAMPHOROSMA.

PTERARIA, in *Natural History*, a class of insects, according to the distribution of Dr. Hill.

PTERIA, in *Ancient Geography*, a province of Asia Minor, situated, according to Herodotus, in Cappadocia, near Sinope.

PTERIDION, in *Botany*, a name used by some authors for

for a small kind of fern common in damp places. Ger. Emac. Ind. 2.

PTERIGYNANDRUM. See PTEROGONIUM.

PTERIS, a name borrowed from the ancient Greeks, whose πτερις; appears to have been some kind of fern, so called on account of its wing-like figure.—Linn. Gen. 559. Schreb. 757. Willd. Sp. Pl. v. 5. 355. Mart. Mill. Dict. v. 3. Swartz Fil. 94. Sm. Act. Taurin. v. 5. 412. Brown Prodr. Nov. Holl. v. 1. 153. Ait. Hort. Kew. v. 5. 519. Juss. 15. Lamarek Illustr. t. 869.—Class and order, *Cryptogamia Filices*. Nat. Ord. *Filices annulatae*.

Ess. Ch. Fructification in an uninterrupted marginal line. Involucrum from the inflexed margin of the frond, bursting inwardly.

The original type of this genus is the common English Brake, or *Filix femina* of old writers. Linnæus founded its character on the continued line of capsules, running along the edge of the leaf beneath. The writer of the present article, in his Essay on the Genera of Dorsiferous Ferns, first adverted to the involucrum, and particularly to its direction, or the manner in which it finally separates. In many species that membrane becomes reflexed or revolute, being pushed back, and usually quite concealed by the abundant capsules. See *FILICES*.

Linnæus describes but nineteen species of *Pteris* in his *Sp. Plantarum*. Willdenow, our latest guide, has 108, to which Mr. Brown has added five or six from New Holland. Mention of others, not yet sufficiently ascertained, may be found at the end of the genus, in Swartz's *Synopsis Filicum* 107, from Thunberg, Lourcuro and others. The genus is divided into numerous sections, according to the division of the frond. The habit of the whole is firm and rather coriaceous; the form and aspect agreeable. In some the stalk is pale and opaque; in others blackish and highly polished.

Section 1. *Frond simple*. Six species in Willdenow.

P. piloselloides. Linn. Sp. Pl. 1530. Willd. n. 1. Banks Ic. Kæmpf. t. 31. Swartz n. 1. t. 2. f. 3.—Barren fronds roundish or obovate; fertile ones linear, elongated, obtuse. Common stalk creeping.—Native of Africa and the East Indies.—The long, branched, slender, scaly stalk creeps to a great extent over the stems and branches of trees, throwing up numerous, alternate, stalked, simple, blunt, entire leaves, or rather fronds, of a thick leathery texture; convex and smooth above; concave, paler, and opaque beneath. Of these the barren ones are hardly an inch long; the rest twice that length, but not so broad as the former, bordered with a broad, dense, hairy line of tawny-brown capsules.

The five remaining species have much the same habit and appearance.

Section 2. *Frond palmate*. Three species.

P. pedata. Linn. Sp. Pl. 1532. Willd. n. 8. Swartz n. 70. (Hemionitis; Plum. Fil. t. 152.)—Fronds very deeply palmate, five-lobed, pinnatifid; their segments linear-lanceolate, acute, partly unequally pinnatifid.—Native of the West Indies and of Virginia.—The whole frond is a foot or more in height, erect, with a dark-coloured polished stalk. The upper surface is deep green; the under paler, but not powdery as in the following species.

Section 3. *Frond ternate*. Four species.

P. argentea. Swartz Syn. n. 71. 105. and 301. Willd. n. 11. Gmel. in Nov. Comm. Petrop. v. 12. 519. t. 12. f. 1. (*P. pedatæ* varietas Sibirica; Linn. Sp. Pl. 1533.)—Fronds white and powdery beneath; the barren ones twice three-lobed; fertile ones ternate, pinnatifid, crenate.—Native of Siberia, in rocky places. An elegant fern three or four

inches high, with a dark purplish polished stalk, and a pentagonal frond, whose under side is clothed with fine dense white powder, not easily rubbed off. Nothing can be more distinct than this and the *pedata*, which last is a much larger fern.

Section 4. *Frond quinate*. One species.

P. pentaphylla. Willd. n. 14.—Frond of five nearly sessile, lanceolate, pointed, sharply serrated leaflets.—Native of rocks in the isle of Bourbon.—Stalk six inches high, square, channelled, green, Leaflets five; the central one three or four inches long, nearly sessile, with very fine parallel veins; the two next about two inches in length, and the two outermost only one inch. Willdenow, from whose account alone we know any thing of this species, never saw the fructification; but he describes the consistence, colour, and appearance, of the barren fronds, as exactly like *P. cretica*.

Section 5. *Frond pinnatifid*. One species.

P. pilosula. Lamarek Dict. v. 5. 717. Swartz n. 60. Willd. n. 15.—“Frond pinnatifid, coriaceous; segments dotted with white, undivided or bluntly lobed. Stalk, as well as the ribs beneath, hairy.”—Native of the island of Mauritius. Lamarek.

Section 6. *Frond pinnate*. Twenty species.

P. trichomanoides. Linn. Sp. Pl. 1532. Willd. n. 17. Swartz n. 49. (*Trichomanes majus*, pinnis sinuatis subtus niveis; Sloane Jam. v. 1. 80. t. 35. f. 1. *T. argenteum*, ad oras nigrum; Plum. Fil. 57. t. 75.)—Frond pinnate. Leaflets ovate-oblong, obtuse, wavy; hairy at the edge; white and powdery beneath.—Not uncommon in dry rocky places in the West Indies. The numerous fronds form a tuft, and are each about a foot high, composed of many short, crowded, bluntish, undulated, sessile leaflets; of a fine green above; white and mealy beneath, having a marginal line of dark capsules, interspersed with golden hairs, such as clothe the common stalk. We see no reason to doubt the identity of Sloane's and Plumier's plants.

P. longifolia. Long-leaved Brake. Linn. Sp. Pl. 1531. Willd. n. 31. Ait. n. 1. Swartz n. 8. Jacq. Hort. Schoenbr. v. 3. 78. t. 399, 400. (*Lonchitis non ramosa*, longis angustis et ad basin auriculatis foliis; Plum. Fil. 52. t. 69.)—Frond pinnate. Leaflets linear, acute, finely serrated; somewhat auricled and heart-shaped at the base. Stalk and main rib rough with scales.—Native of the West Indies. Supposed to have been first introduced into the English stoves by Mr. James Gordon, the celebrated nurseryman of Mile End, about the year 1770.—The fronds grow in tufts, and are, when at their full size, three or four feet high. Leaflets numerous, parallel, narrow, smooth, of a fine green, with three ribs and innumerable transverse veins; the largest near a span long; all are more or less elongated at the base, into a pair of lobes or auricles. Line of fructification pale brown, very dense. Although Jacquin, in his splendid work above cited, devotes two plates to this species, nothing is there shewn in detail of the capsules or involucrum, which in such expensive plates ought not to be omitted.

Section 7. *Frond either pinnatifid or pinnate; the lower divisions compound*. Sixteen species.

P. cretica. Linn. Mant. 130; excluding all the synonyms, except that of Tournefort. Willd. n. 44. Swartz n. 14. (*Lingua cervina*, foliis costæ innascentibus; Tourn. Inst. 545. t. 321.)—Frond pinnate. Leaflets lanceolate, pointed, on short stalks; contracted and serrated at the base; the lowermost in two or three deep divisions.—A native of various parts of the south of Europe, rarely bearing fructification further north than Naples. The

PTERIS.

root bears several pale *fronds* about eighteen inches high, whose *leaflets* are of a rigid, but delicate and transparent texture, with fine parallel veins; the edges more or less partially, and rather acutely, serrated. *Capsules* of a light brown.

P. atropurpurea. Purple Brake. Linn. Sp. Pl. 1534. Willd. n. 46. Ait. n. 4. Swartz n. 76. Schkuhr Crypt. 93. t. 101. (*Filicula faxatilis, osmundæ facie, foliis variis marginè non ferratis*; Pluk. Mant. 81. t. 349. f. 2, 3.)—Fronn pinnate. Lower leaflets ternate or pinnate, lanceolate, obtuse; abrupt or somewhat heart-shaped at the base.—Found in various parts of North America, from whence living plants were brought to Kew garden in 1770. The dark purplish-black of the polished *stalk*, as well as the deep green of the *leaflets*, give this species the habit of an *Adiantum*; but the elongated figure of each *leaflet*, as well as of the whole *frond*, agrees with *Pteris*, as does the *fructification* entirely.

Section 8. *Fronn doubly pinnatifid*. Fifteen species.

P. thalictroides. Swartz n. 23. Willd. n. 52. (*Acrostichum thalictroides*; Linn. Sp. Pl. 1527. A. n. 377; Fl. Zeyl. 179. t. 4. A. n. 17; Amoen. Acad. v. 1. 275. A. filiquosum; Sp. Pl. 1527. A. n. 376; Fl. Zeyl. 179. A. n. 7; Amoen. Acad. v. 1. 270. t. 12. f. 3. *Millefolium aquaticum*; Rumph. Amboin. v. 6. 176. t. 74. f. 1.)—Fronns doubly pinnatifid; segments of the barren ones dilated, irregularly sinuated, obtuse; those of the fertile ones linear, acute, often deeply divided. Native of Ceylon, Amboyna, and Tranquebar. Rumphius informs us of what the fleshy pellucid habit of this singular fern might well lead us to suspect, that it grows in stagnant waters and slow rivulets, flourishing in the dry season, when the water is low. The *root* consists of a dense tuft of very long, mostly simple, pale fibres. *Stalks* thick, succulent, weak and tender. *Barren fronds* broad, very succulent, flaccid when dry, of numerous, irregularly dilated and sinuated, obtuse leaflets; *fertile ones* more compound, with very numerous, narrow, awl-shaped, pale segments, about an inch long, under whose reflexed margins are situated the large, pale-yellowish, rather sparingly dispersed *capsules*, partly imbedded in the succulent *frond*, which they seem so entirely to cover, that we cannot wonder at Linnæus for having referred the plant to his genus *Acrostichum*. That he divided it into two species is less easily to be accounted for.

P. macroura. Willd. n. 56. (*Filix latifolia caudata, pinnulis lonchitidis dentatis*; Plum. Fil. 11. t. 13.)—"Fronn pinnate. Leaflets ovate-oblong, pinnatifid; segments lanceolate, serrated towards the point; the terminal one very long, tapering, deeply serrated."—Found near the sides of rivers in Martinico and Hispaniola, by Plumier, the only writer who has given an original account of this species. Willdenow is the only systematic author who has adopted it from him, though it seems a handsome well-defined species, very distinct from all others. The *stalks* are two feet high, slender, brown, smooth and naked, every one bearing three or four pair, besides a terminal odd one, of elliptic, or ovate-oblong, *leaflets*, each deeply and copiously pinnatifid, and ending in a long narrow serrated point. The segments are also serrated towards the extremity, bearing a marginal row of chestnut-coloured *capsules* lower down.

Section 9. *Fronn doubly pinnatifid, doubly or triply pinnate, the lowermost division deeply divided*. Eleven species.

P. baurita. Linn. Sp. Pl. 1534. Willd. n. 67. Swartz n. 25. (*Filix pinnulis lonchitidis obtusis non dentatis, ad oras pulverulentis*; Plum. Fil. 13. t. 15.)—Fronn pinnate. Leaflets pinnatifid; their segments linear, obtuse, toothed

at the end; the lowest leaflets deeply divided.—Found in various parts of the West Indies. The *fronds* are two or three feet high, of a bright green, and very conspicuous for the deep division of each of their two lowest branches or *leaflets*, which are, in a manner, a pair of twin *leaflets* at each side.

Section 10. *Fronn doubly or triply pinnate*. Twenty-three species.

P. crispa. Curled Stone Fern, or Rock Brake. Linn. MSS. in Sp. Pl. 1522. Sm. Fl. Brit. 1137. Engl. Bot. t. 1160. Willd. n. 89. Swartz n. 101. Ait. n. 6. (*Osmunda crispa*; Linn. Sp. Pl. 1522. Bolt. Fil. 10. t. 7. Fl. Dan. t. 496. *Adiantum album floridum*; Pluk. Phyt. t. 3. f. 2.)—Fronns repeatedly compound. Leaflets of the barren ones wedge-shaped, cut at the extremity; those of the fertile ones elliptical, obtuse, convex.—This pretty species is found on the mountains of Lapland, Norway, Germany, Switzerland, and the Pyrenees, as well as in Britain. In Westmoreland it occurs plentifully on dry stony open ground, about the sides of lofty hills, being in perfection from June to September.—The *fronds* grow many together, in tufts, from six to twelve inches high, of a pale but pleasant green. Each consists of a long smooth *stalk*, supporting an ovate, or somewhat triangular *leaf*, which is twice or thrice compound in an alternate manner. The *leaflets* of the shorter *fronds* are barren, dilated, wedge-shaped, sometimes pinnatifid, all cut or toothed at the extremities; those of the taller ones all fertile, longer and narrower than the former, their margins pale, membranous, crenate, so strongly inflexed as nearly to meet over the dense lines of tawny *capsules*.

P. nigricans. Willd. n. 90. (*Filix crenis rotundis, et nigricante limbo præcinctis*; Plum. Fil. 32. t. 42. Swartz Fil. 108.)—Fronn doubly pinnate. Leaflets ovate-oblong, obtuse, strongly crenate. Partial stalks zigzag.—Found by Plumier in abundance by the sides of rivulets, in the moist woods of Hispaniola. No other botanist appears to have met with this fern, nor did Swartz venture to refer it to any genus, he having merely indicated it as a probable species of *Pteris*. Willdenow has been less scrupulous, and perhaps justly. The creeping *root* throws up many *fronds*, a foot or more in height; their outline of a broad lanceolate figure; their *stalks* smooth and slender. Each is doubly, alternately, and copiously pinnate, their partial *stalks* remarkably zigzag. *Leaflets* so strongly crenate as to seem almost pinnatifid, but very obtusely; their upper surface of a fine shining green; the lower pale, ribbed, and downy. *Fructification* in a blackish uninterrupted line, along the obtuse edge of each segment.

P. aculeata. Prickly-stemmed Brake. Swartz n. 40. Ind. Occ. v. 3. 1601. Willd. n. 98. Ait. n. 7. (*Filix arborescens, ramosa et aculeata*; Plum. Fil. 6. t. 5 and 11.)—Fronn doubly pinnate. Leaflets oblong, pointed, pinnatifid; segments lanceolate, acute, serrated. Stalk arborescent, thorny.—Native of the forests of Martinico, where Plumier observed it in plenty. Swartz says it grows in the rather mountainous woods of Jamaica. Living plants were brought to the stoves at Kew in 1793, but we know not how they have succeeded there. Plumier describes the main *stem* as thick as a man's body, but low, and beset with black spines. This *stem* however appears to be produced in very aged plants only, the generality merely throwing out a number of no less spinous *stalks*, from one very thick tufted *root*. Each stalk is almost three inches in diameter at its origin, and the whole *frond*, of a fan-like figure, and subsequently twice pinnate, is as tall as a man. The segments of the *leaflets*, when barren, as in Plumier's t. 11, are serrated through-

throughout; otherwise at the point only, the sides being each occupied by a dense line of *capsules*, not continued or united along the sinus at the bottom. *Polypodium spinosum*, Linn. Sp. Pl. 1554, figured in Sloane's Jamaica v. 1. t. 56, though cited by Swartz and Willdenow, is evidently a totally different plant, and perhaps a *Cyathea*. Whether Swartz intended this only as a native of Jamaica, or whether he found there the genuine *Pteris aculeata*, we have no certain information.

Section 11. *Fronde in three deep divisions, or pedate with doubly pinnate branches.* Seven species.

Perhaps, if we may judge by Plumier's description, the last-described species ought rather to be placed in this section.

P. esculenta. Eatable-rooted Brake. Forst. Prodr. n. 418. Swartz n. 43. Willd. n. 103. Billard. Nov. Holl. v. 2. 95. t. 244.—Fronde in three deep divisions. Branches doubly pinnate. Leaflets pinnatifid, with linear, obtuse, decurrent segments; the upper ones elongated and undivided.—Native of the Society islands, and of Van Diemen's land. The natives feed on the *root*, which is creeping, thick, knotty and brittle, full of a starch-like pith. The *fronds* are two or three feet high, much resembling our Common Brake, *P. aquilina*, but more coriaceous, much less uniformly pinnatifid in their ultimate divisions, and remarkable for the simple elongations of the extremities.

P. aquilina. Common Brake. Linn. Sp. Pl. 1533. Sm. Fl. Brit. 1136. Engl. Bot. t. 1679. Willd. n. 105. Swartz n. 41. Ait. n. 9. Bolt. Fil. 16. t. 10, bad. (Felix fœmina; Ger. Em. 1128. Matth. Valgr. v. 2. 627.)—Fronde in three deep divisions. Branches doubly pinnate. Leaflets crowded, lanceolate, acute; the upper ones confluent.—Native of dry barren woods and heaths in all parts of Europe, as well as the north of Asia and America. With us it is the most common fern, and well known for its uses for packing, firing, and shelter, of various kinds. It is sometimes killed in very hard winters. The *fronds* are annual, originating from a perennial, creeping, scaly *root*, and rise to the height of from two to five feet, according to the soil. They are rigid and harsh, cutting the hands if incautiously drawn through them. Their colour is a light green, and they spread in a handsome, partly horizontal posture, being regularly compounded in an almost pectinate manner. The upper part of each branch is simple, as in *P. esculenta*, but not elongated, or enlarged, so conspicuously as in that species.

Section 12. *Fronde repeatedly forked.* One species.

P. cornuta. Beauvois Oware, 63. t. 37. Willd. n. 108.—Fronde repeatedly forked; segments awl-shaped, alternate. Capsules in simple rows.—An aquatic species, found by M. Palissot de Beauvois, in salt ditches or pools, near the sea, at Oware on the coast of Guinea. This plant is evidently, as its discoverer remarks, akin to *P. thalictroides*, see sect. 8. It bears tufts of a parasitical plant, perhaps a *Marfilea*, which might easily be taken for barren *fronds*, or *leaflets*, of its own.

PTERIUM, in *Ancient Geography*, a town of Asia, in Media. Steph. Byz.

PTEROCARPUS, in *Botany*, so named by Loeffling and Linnæus, from πτερον, a wing, and καρπος, fruit, the margin of the legume being dilated into a flat wing-like expansion.—Linn. Gen. 366. Schreb. 484. Willd. Sp. Pl. v. 3. 904. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 4. 248. Juss. 364. Lamarek Illustr. t. 602. Gært. t. 156.—Class and order, *Diadelphia Decandria*. Nat. Ord. *Papilionaceæ*, Linn. *Leguminosæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, of a tu-

bular bell-shape, with five acute teeth. *Cor.* papilionaceous; standard roundish-heartshaped, spreading, convex, with a long claw; wings lanceolate, shorter; keel short. *Stam.* Filaments ten, all connected; anthers roundish. *Pist.* Germen stalked, oblong, compressed; style awl-shaped; stigma simple. *Peric.* Legume roundish-falcate, compressed, with a leaf-like edge, veiny at the sides, woody within, not bursting, the cell, or cells, longitudinally disposed. *Seeds* solitary; kidney-shaped, thickest at the base.

Ess. Ch. Calyx five-toothed. Stamens all united. Legume falcate, leafy, with tumid veins, bordered with a wing, not bursting. Seeds solitary.

1. *P. Draco*. Dragon's-blood Pterocarpus. Linn. Sp. Pl. 1662. Willd. n. 1. (*P. officinalis*; Jacq. Amer. 283. t. 183. f. 92. Moutouchi suberosa; Aubl. Guian. v. 2. 748. t. 299. Draco arbor indica filiquosa, populi folio; Commel. Hort. v. 1. 213. t. 109.)—Leaves pinnate, ovate, pointed. Stipulas oblong, obtuse. Legume rounded at the extremity.—Native of South America.—A tree thirty feet high, yielding a red pellucid resin, which had formerly the reputation of stopping hæmorrhages, but is now out of use. *Leaves* of two or three pair of shining leaflets, with a larger odd one. *Flowers* yellow, in compound axillary clusters. *Legume* an inch and a half broad, obtuse, marked with strong elevated lateral veins. Gærtner's *P. hemiptera* seems, notwithstanding his opinion, to be the same with this. It is a stranger to our gardens, though formerly raised from seed at Amsterdam.

2. *P. indicus*. East Indian Pterocarpus. Willd. n. 2. (Lingoum, anxana; Rumph. Amb. v. 2. 205. t. 70.)—Leaves pinnate, oblong, pointed. Stipulas none. Legume sharp-pointed.—Native of the East Indies. Willdenow has distinguished it from the foregoing, by the figure of Rumphius only, but perhaps justly. The wood is said to be valuable for the finer kinds of cabinet work, being beautiful and fragrant. *Flowers* of a fine deep yellow, smelling like Wall-flowers.

3. *P. Marsupium*. Pouch Pterocarpus. Roxb. Coromand. v. 2. 9. t. 116. Willd. n. 3.—Leaves pinnate, elliptical, emarginate. Stipulas none. Clusters terminal, thrice compound.—Native of the Circar mountains of Coromandel, flowering in the rainy season. Dr. Roxburgh describes it as a very large tree, whose wood, of a yellowish-orange colour, and hard, but not heavy, is much esteemed by the natives, and used for various purposes. The *flowers* are copious, white with a tinge of yellow. *Legume* with an oblique acute wing.

4. *P. Robrii*. Guiana Pterocarpus. Vahl. Symb. v. 2. 79, excluding the synonyms.—Leaves pinnate, oblong-lanceolate, pointed. Stipulas none. Clusters simple, axillary. Legume orbicular.—Native of South America.—A tree, with smooth, round, greyish branches. *Leaves* of three or four pair of ovate-oblong, pointed, smooth, shining leaflets, with an odd one. *Clusters* half the length of the leaves. *Flowers* drooping. *Legume* membranous, smooth, nearly orbicular, an inch and a half long. *Seed* one. Mr. König, in Ann. of Bot. v. 1. 358, has corrected Vahl and Willdenow, who cite under this species Aublet's *Apalatoa spicata*, Guian. v. 1. 382. t. 147, a plant differing from it in genus.

5. *P. lunatus*. Crescent-podded Pterocarpus. Linn. Suppl. 317. Willd. n. 5. Ait. n. 1. (*P. aptera*; Gært. v. 2. 351. t. 156. Medicago leguminibus lunatis; Plum. Ic. t. 201. f. 2.)—Leaves pinnate. Stipulas spinous. Legume crescent-shaped, thick-edged.—Native of Surinam, from whence specimens in spirits were sent to Linnæus by Dalberg. Living plants were introduced at Kew in 1792,

by Mr. Alexander Anderfon, but never flowered there. This is a rigid *shrub*, or *tree*, with a pair of strong hooked spines, at the base of each leaf, in the place of *stipulas*. *Leaves* of from five to seven alternate, oblong, obtuse *leaflets*, about an inch long, one of them terminal. *Panicle* terminal, downy, its branches spiked, incurved. *Flowers* white. *Legume* full an inch broad, thick, woody, and smooth, curved so completely round that the point folds over the base; the edge is thick and even, without any wing. *Seed* one, large.

6. *P. santalinus*. Three-leaved Pterocarpus. Linn. Suppl. 318, excluding the reference to Aublet. Willd. n. 6. Ait. n. 2. — *Leaves* ternate, roundish, abrupt, very smooth. *Petals* crenate, wavy. — Native of mountainous precipices in the East Indies, where it was observed by Koenig and Roxburgh. Sir Joseph Banks procured it for the stoves at Kew in 1800, but the plant has not yet flowered there. A very lofty *tree*, with a *bark* like Alder, and alternate *branches*. *Leaves* rarely pinnate, mostly ternate, hoary beneath. *Stipulas* none. *Clusters* axillary; simple or branched. *Flowers* yellow, streaked with red. *Legume* curved upwards, with a membranous wing along the lower edge. This was sent to Linnæus as a kind of *Santalum rubrum*, or Red Sanders Wood, having been ascertained as such by Koenig. It is described as hard and heavy, deep red with black veins, and taking a fine polish. The finely perfumed wood, commonly called Sandal wood, and used for fans, necklaces, &c. is very different. See SIRIUM *myrtifolium*.

7. *P. Ecastaphyllum*. Oval-leaved Pterocarpus. Linn. Syst. Nat. ed. 12. v. 2. 439. Swartz Obs. 275. Willd. n. 7. Ait. n. 3. Bergius in Act. Holm. for 1769. 117. t. 4. (Hedyfarum Ecastaphyllum; Linn. Sp. Pl. 1052. Ecastaphyllum; Browne Jam. 299. t. 32. f. 1. Spartium scandens, citri foliis, floribus albis ad nodos confertim nascentibus; Plum. Ic. 244. t. 246. f. 2.) — *Leaves* simple, ovate, pointed; silky beneath. — Native of the West Indies. Found by Browne, in low swampy places, about Kingston in Jamaica. Houlton sent seeds of this species to Miller, but it seems not to have survived in our gardens. The *stem* is shrubby, spreading obliquely to the extent of six or seven feet. *Leaves* all simple, three or four inches long, and one and a half broad, downy all over when young. *Stipulas* oblong. *Flowers* few together, in short axillary clusters.

PTEROCEPHALUS. See SCABIOSA.

PTEROCOCCUS, from πτερον, a wing, and κοκκος, a berry, a name given by Pallas to the plant which Linnæus called PALLASIA, but which was rightly referred by L'Heritier to CALLIGONUM; see those articles.

PTEROGONIUM, altered by Swartz from Hedwig's *Pterigynandrum*, a name designed to express that the male and female flowers, in this genus of Mosses, are both axillary, or lateral, on a pinnate stem. — Swartz Musc. Suec. 26. Sm. Fl. Brit. 1270. Turn. Musc. Hib. 32. Schwaegr. Hedw. Sp. Musc. Suppl. 1. 100. (Pterigynandrum; Hedw. Sp. Musc. 80.) — Class and order, *Cryptogamia Musci*. Nat. Ord. *Musci*.

Eff. Ch. Capsule oblong, from a lateral scaly sheath. Fringe simple, of 16 linear upright teeth. Veil generally hairy.

The simple *peristomium*, or fringe, distinguishes this genus from *Hypnum* and *Neckera*, without adverting to the upright hairs of its veil, which, though usual, are not invariably present. Hedwig describes nine certain species in his *Species Muscorum*, to which four are added by his editor and continuator Dr. Schwaegrichen, in a Supplement published at Leipzig in 1811. To these 13, are added three others by

the writer of the present article, one of them the Linnæan *Hypnum sciuroides*, or *Dicranum sciuroides*, Fl. Brit. 1215. We shall confine our remarks to the six British species.

P. gracile. Slender Wing-moss. Fl. Brit. n. 1. Engl. Bot. t. 1085. Hedw. Sp. Musc. Suppl. 1. n. 7. (Pterigynandrum gracile; Hedw. Crypt. v. 4. 16. t. 6. Hypnum gracile; Linn. Mant. 310. H. gracile ornithopodioides; Dill. Musc. 320. t. 41. f. 55.) — *Stem* creeping. *Branches* clustered, cylindrical, recurved. *Leaves* ovate, finely serrated. — Native of the trunks of trees, and mountainous rocks, in Britain, Switzerland, Portugal, Carinthia and Carniola, bearing capsules in spring and summer, but rarely with us. This plant forms broad, dense, cushion-like tufts, composed of wiry, creeping, much divided *stems*, throwing up innumerable recurved, slender, leafy *branches*, about an inch high. The *leaves* are every way closely imbricated, deep green; yellowish and shining in exposed situations; their form broad-ovate, ribless, minutely toothed or serrated. *Sheaths* lateral, small, pale. *Fruit-stalks* solitary, hardly an inch long, red. *Capsule* cylindrical, nearly erect. *Lid* conical, bluntish, rather curved. *Veil* pale, slender, clothed with upright deciduous hairs.

P. filiforme. Capillary Wing-moss. Hedw. Sp. Musc. Suppl. 1. n. 2. Engl. Bot. t. 2297. (Pterigynandrum filiforme; Hedw. Crypt. fasc. 4. 18. t. 7. Hypnum filiforme; Timm. Megapolit. 225.) — *Stem* decumbent, weak, irregularly branched, creeping. *Leaves* ovate, serrated, closely imbricated. *Capsules* ovate-oblong, erect. — Native of mountainous rather shady rocks, in the middle of Europe, but not common, bearing fruit in summer. This species was detected, since the publication of *Fl. Brit.*, on Ben Lawers in Scotland, by the late Mr. Geo. Don, and in Ireland, by Mr. J. T. Mackay. The *stems* and *branches* are prostrate, in dense entangled patches, and clothed with very small, closely imbricated, slightly oblique *leaves*, of a deep, scarcely shining, green, without rib or furrows; their upper half serrated. *Sheaths* pale, with long, taper-pointed, serrated scales. *Stalks* tawny. *Capsule* shorter, and more ovate, than in the preceding. *Lid* conical, with a blunt point. The *veil* has not been observed.

P. sciuroides. Squirrel-tail Wing-moss. Turn. Musc. Hib. 32. Engl. Bot. t. 1903. (Dicranum sciuroides; Fl. Brit. 1215. Swartz Musc. Suec. 32. Hypnum sciuroides; Linn. Sp. Pl. 1596. H. arboreum sciuroides; Dill. Musc. 319. t. 41. f. 54.) — *Stems* creeping, branched. *Branches* cylindrical, incurved by drying. *Leaves* ovato-lanceolate, striated, entire. *Veil* smooth. *Teeth* of the fringe deeply cloven. Found on the trunks of trees abundantly, in most parts of Europe, though rarely bearing capsules in Britain. The habit of the plant is perhaps most akin to *P. gracile*, but the whole is of larger dimensions. The *leaves* are of a rich green, entire, with three longitudinal plaits, but no ribs. They are sometimes, in Norfolk, accompanied by axillary branching tufted buds. *Sheaths* axillary, long and taper. *Stalks* tawny, hardly thrice as long. *Capsule* erect, ovate, smooth. *Lid* conical, red. *Veil* slender, naked. *Fringe* small, tender, pale, its teeth deeply divided, but resembling the internal fringe of *Hypnum* in texture, not the firm teeth of a true *Dicranum*. This circumstance, and especially the lateral situation of the female, as well as male, *flowers*, first induced Mr. D. Turner to remove the plant in question to the genus where we now retain it. The male *flowers* are red.

P. Smithii. Curling Wing-moss. Swartz in Schrad. Journ. v. 2. 173. Fl. Brit. 1271. Engl. Bot. t. 1326. Schwaegr. in Hedw. Sp. Musc. Suppl. 1. 105. (Hypnum Smithii; Dickf. Crypt. fasc. 2. 10. t. 5. f. 4. Dr. Pl.

n. 19. Hedw. Sp. Musc. 264. t. 68. f. 5-7. Muscus squamosus filicinus repens atro-virens, &c.; Mich. Gen. 114. n. 98.)—Stems creeping, much branched. Branches pinnate, incurved by drying. Leaves entire. Sheath nearly as long as the fruit-stalk. Found on the trunks of trees in Italy; very plentifully in the old gardens of Florence, Rome, Genoa, &c., bearing abundance of fruit in the winter and spring. The writer of this, whose name, by the friendship of Mr. Dickson, has been given to the present curious species, had the good luck to discover it, the day after he landed in England from the continent, near a small inn on Barham downs, Kent, where, and in other places, it has since been found by several English botanists. The stems are depressed and creeping, much divided, throwing up many triply pinnate branches, about two inches high, which are well compared by Micheli, in their moist state, to spruce firs in miniature, laden with cones. When dry, they speedily become incurved, or curled, in every part. The leaves are closely imbricated, roundish, obtuse, entire, deep green, opaque, with one rib at the base only. Sheaths long, pale, their inner scales taper-pointed. Stalks yellowish, scarcely exceeding the sheaths, twisted at the apex. Capsule cylindrical, inclining to ovate, with a narrow mouth, smooth, brown. Fringe small, pale, deciduous, of 16 undivided teeth. Lid conical, oblique. Veil yellow, shining, clothed with copious erect hairs.

P. rotundifolium. Round-leaved Wing-moss. Turn. MSS. Engl. Bot. t. 2525.—Stems ascending, tufted, scarcely branched. Leaves closely imbricated, roundish-ovate, obtuse, entire. Discovered by Mr. Mackay in the south of Ireland, but without fructification, so that it is presumptively only, by its habit, referred to *Pterogonium*, like the next-described species. The stems are ascending, or nearly erect, hardly an inch high, in dense tufts; each of them generally simple, leafy, swelling upwards, and obtuse. Leaves closely imbricated every way, broad, of a pale but dull green, minutely reticulated, with little or no appearance of any rib.

P. caespitosum. Matted Wing-moss. Engl. Bot. t. 2526.—Stems branched, entangled, prostrate, slender. Ultimate branches ascending, obtuse. Leaves ovate, concave; revolute at the base; minutely serrated at the summit. Gathered by Mr. W. Borrer, on rocks by the river at Dulzie bridge, Scotland. The wiry much-divided stems throw up many short, simple, obtuse, ascending branches, clothed with larger and paler leaves than those on the main stems. As no fructification has been found, we cannot be certain of the genus, though the habit is such as to leave no scruple in our minds on that subject.

PTERON, in *Ancient Geography*, a promontory of Lower Mysia, between the mouth of the Danube, called Sacrum Ostium, and the town Istropolis, according to Ptolemy.

PTERONIA, in *Botany*, from πτερον, a wing; altered by Linnæus from the *Pterophorus* of Vaillant, a word which seems to allude to the feathery scales of the receptacle.—Linn. Gen. 414. Schreb. 542. Willd. Sp. Pl. v. 3. 1776. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 4. 511. Juss. 174. Lamarck Illustr. t. 667. Gært. t. 167.—Class and order, *Syngenesia Polygamia-aqualis*. Nat. Ord. *Compositæ discoideæ*, Linn. *Cinaroccephala*, Juss.

Gen. Ch. Common calyx imbricated, with lanceolate, keeled, pointed scales. Cor. compound, uniform, the florets numerous, equal, all perfect, tubular, funnel-shaped, with a five-cleft acute limb. Stam. Filaments five, capillary, very short; anthers united into a cylindrical tube. Pyl. Germen oblong; style thread-shaped, the length of the

stamens; stigma cloven. Peric. none, except the unchanged calyx. Seeds solitary to each floret, oblong, compressed. Down sessile, rather feathery, its rays somewhat hairy. Recept. bristly, flattish, its scales cut into numerous segments, whose bristly points are shorter than the seeds.

Obs. Jussieu says that in some species, if not in all, at least those with opposite leaves, the receptacle is certainly naked; though the seeds, being not only crowned with down, but clothed with villous hairs, give an appearance of a bristly receptacle. This account does not agree with Gærtner, nor with what we have observed.

Ess. Ch. Receptacle clothed with many-cleft scales. Down somewhat feathery. Calyx imbricated, with keeled scales.

A genus of rather humble rigid shrubs, of which Linnæus has only one species, *camphorata*, in his *Sp. Pl.* but which the discoveries of Thunberg chiefly have so greatly enriched, that Willdenow admits 27, all natives of the Cape of Good Hope, except the last, a very doubtful *Pteronia*, from Mexico. We select a few examples.

P. spinosa. Thorny Pteronia. Linn. Suppl. 357. Willd. n. 1. Thunb. Prodr. 113.—Leaves awl-shaped, becoming pungent spines. The stem is woody, round, much branched. Leaves remote, alternate, sessile, spreading widely, awl-shaped, rigid, with a sharp spinous termination, permanent and finally much hardened. Flowers about four, sessile, axillary, near the tops of the branches.

P. camphorata. Aromatic Pteronia. Linn. Sp. Pl. 1176. Willd. n. 2. Ait. n. 1. (*Conyza aromatica frutescens mauritanica, camphorata foliis, &c.*; Pluk. Mant. 56. t. 345. f. 2.)—Leaves scattered or fasciculate, thread-shaped, ciliated. Calyx-scales finely serrated. Hairs of the receptacle somewhat tufted. Introduced from the Cape by Mr. Masson in 1774. It blossoms from June to September, and is sheltered in the green-house in winter. Stem much branched, about a yard high. Leaves very narrow, flat, spreading. Flowers terminal, yellow, solitary, larger than those of *Santolina maritima*. It appears, from Mr. Masson's communications to Sir Joseph Banks, that he gathered this species in sandy ground, near Swartland.

P. oppositifolia. Forked Pteronia. Thunb. Prodr. 143. Willd. n. 18. Ait. n. 3. (*Cyanus centauroides frutescens, lavandulæ folio*; Breyn. Ic. 28. t. 17. f. 3.)—Leaves ovate, clothed with powdery down. Calyx-scales ovate, entire.—Sent by Mr. Masson from the Cape in 1774. It flowers with us in July. A small shrub, hardly six inches high, with opposite forked branches. Leaves small, ovato-lanceolate, hoary. Flowers terminal, sessile, yellow.

P. Porophyllum. Dotted-leaved Pteronia. Cavan. Ic. v. 3. 13. t. 225. Willd. n. 27.—Leaves pinnatifid, obtuse, with fringe-like teeth.—Native of Mexico. It flowered in the garden at Madrid in November, being an annual herbaceous plant, about two feet high. Leaves scattered, about two inches long, pinnatifid, lyrate, obtuse, their serratures tipped with long hairs. Flowers terminal, solitary, yellow, with pinnatifid, almost capillary, bracteas.

PTEROPHÆNICUS INDIARUM, in *Ornithology*, a name under which Nieremberg has described a bird, which he says is called by the Spaniards there *commendadoza*, remarkable for the redness of the upper part of its wings. It is of the shape and size of the starling, and not unlike it in colour, but for the singularity of the upper part of their wings, which, in one part of their lives, are of a yellowish or orange colour, and in the rest red. They are kept in cages, and learn to imitate the human voice; they feed on vegetables, principally Indian corn, and are common as well in the colder as in the hotter climates; flying in large flocks, and often doing

doing great damage to the people. They build in trees and are eaten there; but are no very valuable bird. See *ORIOBUS Phanicus*.

PTEROPHORES, in *Ancient Geography*, a country of Scythia, towards the Riphæan mountains, according to Pliny.

PTEROPHORI, Πτεροφοροι, in *Antiquity*, a name given to such of the Roman couriers as brought tidings of any declaration of war, a battle lost, or any mishap befallen the Roman armies.

They were so called, because they bore wings on the points of their pikes; from the Greek πτερον, *wing*, and φερω, *I bear*.

PTEROPHORUS, in *Botany*. See *PTERONIA*.

PTEROPUS, in *Zoology*. See *VESPERTILIO*.

PTEROSPERMADENDRON, in *Botany*. See *PENTAPETES* and *PTEROSPERMUM*.

PTEROSPERMUM, a very superb East Indian genus, whose name is derived from πτερον, *a wing*, and σπέρμα, *seed*. It was originally placed under *Pentapetes*, by Linnæus in the *Flora Zeylanica*.—Schreb. 461. Willd. Sp. Pl. v. 3. 728. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 4. 194. Lamarck Illustr. t. 576. (*Pterospermadendron*; Amman. in Act. Petrop. v. 8. 215. *Pentapetes*; Linn. Zeylan. 113.)—Class and order, *Monadelphia Dodecandria*. Nat. Ord. *Columnifera*, Linn. *Malvaceæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, deeply cloven into five, coriaceous, oblong, reflexed segments. *Cor.* Petals five, oblong, spreading. *Stam.* Filaments fifteen, linear, combined at the base into a tube; anthers oblong, erect, twisted. At every third stamen is a long, coloured, erect body, as long as the petals, resembling a barren stamen, but without any anther. *Pist.* Germen superior, roundish, (stalked?); style cylindrical, the length of the stamens; stigma thickish. *Peric.* Capsule stalked, woody, ovate, five-celled, each cell two-valved. *Seeds* numerous, oblong, compressed, with a membranous wing.

Ess. Ch. Calyx simple, five-cleft. Petals five. Stamens twenty; five of them barren. Style cylindrical. Stigma thickish. Capsule woody, five-celled. Seeds winged.

1. *P. suberifolium*. Various-leaved *Pterospermum*. Willd. n. 1. (*Pentapetes suberifolia*; Linn. Sp. Pl. 959. Cavan. Diff. 3. 130. t. 43. f. 2.)—Leaves oblong, pointed; slightly toothed at their tips.—Native of the East Indies. It flowers in September and October. The branches of this handsome plant are erect, and covered with a rusty down. Leaves alternate, on short stalks, thick, green above, whitish beneath, with a strong, longitudinal rib. Flowers axillary, at the summits of the branches, one, two, or three together, white. Linnæus remarked that the leaves of this plant resembled those of the *Ilex*, or Holm Oak, in substance; and that its flowers had the appearance of *Michelia* and *Grewia*.

2. *P. acerifolium*. Maple-leaved *Pterospermum*. Willd. n. 2. Bot. Mag. t. 620. (*Pentapetes acerifolia*; Linn. Sp. Pl. 959. Cavan. Diff. 3. 131. t. 44.)—Leaves oblong, heart-shaped, obtuse, nearly entire.—Native of the East Indies, and introduced by Messrs. Lee and Kennedy about 1790. It flowers from July to September. This very superb species, considerably larger than the preceding in all its parts, but exceedingly similar to that in habit, has its bark covered with a white wool, like the underside of its leaves, which are peltate, and supported on long footstalks thickened at both ends. Flowers terminal, white, fragrant. Calyx like thick buff leather, externally dotted, like the stem, with red and brown.

PTEROSTYLIS, from πτερον, *a wing*, and στυλο:, *a*

column, because of the winged style, or column of the fructification.—Brown Prodr. Nov. Holl. v. 1. 326. Ait. Hort. Kew. v. 5. 204.—Class and order, *Gynandria Monandria*. Nat. Ord. *Orchideæ*.

Gen. Ch. *Cal.* Perianth superior, ringent, of two lanceolate pointed leaves; the lowermost deeply divided, or rather composed of two, combined in their lower part. *Cor.* Petals two, oblong, converging with the upper calyx-leaf. Nectary a lanceolate stalked lip, shorter than the petals, with an appendage, or swelling, at the base; its claw connected below with the lower calyx-leaf. *Stam.* Column united at its base with the petals and upper calyx-leaf; winged on each side at the upper part; anther a terminal, moveable, permanent lid, its cells close together; masses of pollen powdery, compressed, two in each cell. *Pist.* Germen inferior, oblong, with six furrows; style, column as above described; stigma tumid, attached to the middle of the column. *Peric.* Capsule of one cell and three valves. *Seeds* numerous, minute, attached to three longitudinal receptacles.

Ess. Ch. Lip stalked, with an appendage at the base. Two lower calyx-leaves combined, and united to the claw of the lip. Column winged in the upper part. Anther a terminal lid. Pollen powdery.

Of this curious and very distinct genus of New Holland *Orchideæ*, Mr. Brown enumerates nineteen species, in three sections. They all grow on the ground, and are smooth herbs, with a pair of naked, undivided, round bulbs. Leaves sometimes radical, stellated, ribbed, membranous, the flower-stalk being, in that case, leafless, though furnished with bractæas; sometimes cauline, alternate, none radical. Flowers solitary, rarely in clusters, of a pale yellowish-white; their size, for the most part, rather considerable.

SECT. 1. *Appendage to the lip divided, and tufted, at the tip. Leaves radical, stellated. Stalk bracteated, leafless.* Eight species.

P. concinna. Elegant *Pterostylis*.—“Leaves radical, stellated. Stalk with one bractea near the middle. Lip emarginate, within the flower, the length of the column.”—Gathered by Mr. Brown, and Mr. Caley, near Port Jackson. Leaves three or four, heart-shaped, stalked, reticulated, about half an inch long. Stalk four or five inches high, with one bractea near the base, and another more than half way up. Flower solitary, rather large, striped with green and white; the lower calyx-leaf with two very long, slender, divaricated points.

P. ophioglossa. Cloven-tongued *Pterostylis*. Br. n. 2.—“Leaves radical, stellated. Stalk naked in the middle. Lip emarginate, longer than the column, protruding at the summit.”—Observed by Mr. Brown about Port Jackson, as well as in the tropical part of New Holland.

SECT. 2. *Appendage divided, mostly tufted. Radical leaves none when the plant is in flower. Stem leafy.* Five species.

P. obtusa. Blunt-lipped *Pterostylis*. Br. n. 9. Ait. n. 1.—“Stem leafy, single-flowered. Lip obtuse, not contracted towards the end; appendage tufted.”—Gathered by Mr. Brown near Port Jackson, and sent by Mr. George Caley, in 1800, to Kew, where it is said to be a green-house plant, flowering in July and August.

P. reflexa. Br. n. 10. (*Disperis alata*; Labill. Nov. Holl. v. 2. 59. t. 210.)—Stem leafy, single-flowered. Lip tapering, acute; appendage tufted. Petals with an angular entire dilatation at their inner margin. Found by Dr. White and Mr. Brown near Port Jackson; by M. Labillardiere at Van Diemen's land. The stem is a span high, straight, erect. Leaves rather distant, lanceolate, sheathing,

sheathing, acute, about an inch and half long. *Flower* erect, about the same length, exclusive of the *germen*, white striped with green.

SECT. 3. *Appendage obtuse, undivided.* Five species.

P. gibbosa. Br. n. 17.—“Leaves radical, stellated. Bractæas distant. Calyx pointed. Lip thickish, naked above, with a bristle on each side at the base.”—Gathered by Mr. Brown, near Port Jackson.

P. mutica. Br. n. 18.—“Leaves radical, stellated. Calyx rather obtuse. Lip membranous.”—From the same country.

SECT. 4. *Character of foliage uncertain.* One species.

P. dubia. Br. n. 19.—“Radical leaves . . . ? those on the stem two; the upper one shorter than the flower-stalk. Calyx slightly downy. Lip undivided, with a tufted appendage.”—Native, as Mr. Brown informs us, of Van Diemen's land. It is suspected to be but a variety of *P. cucullata*, his sixth species.

Mr. Brown has shewn us another species of this genus, found by sir Joseph Banks in New Zealand; and he informs us that the late colonel Paterfon has discovered two more in the neighbourhood of port Dalrymple, Van Diemen's land, where he established a colony.

PTEROTRACHEA, in *Ichthyology*. Body detached, gelatinous, with a moveable fin at the abdomen or tail; two eyes, placed within the head. There are four species, of which the first has been pretty fully described, as follows:

Species.

CORONATA. Abdomen and tail furnished with fins; head with a round perpendicular proboscis, and a coronet of ten spines on the front. It inhabits the Mediterranean and Archipelago. The body is subcylindrical, about a span long, and an inch in diameter; the head is rounded on the fore-part, and furnished in front with a coronet of ten spines; beneath the coronet is the proboscis, two inches long, with a whitish middle nerve, and thick hyaline tip, and terminal mouth; the eyes are seated on each side the back of the neck internally, and remote; trunk near the fin beneath spotted with white; abdomen rough beneath, with an ovate pendulous pouch before the fin; vent near the ligament of the tail; the tail is vertical, an inch long, and triangular, with four prickly lines on each side; the fin is situated beyond the middle of the body; it is orbicular, compressed, and fixed to the white laminæ of the trunk, which are crenate on each side; beneath in the margin is another pinnule, which is bell-shaped, hyaline, and affixed by a middle point.

HYALINA. Head elongated, projecting, smooth; the fin is central.

PULMONATA. Head obtuse, hyaline; intestine respiratory and ciliate, with plumes.

ACULEATA. Abdomen without fin; tail longer than the trunk, with prickly lines, and a terminal horizontal fin. This, as well as the first, is found in the Archipelago. The habitation of the others is not known.

PTERYGIUM, or **PTERYGION**, dim. of πτερύξ, a wing. By the term pterygium, surgeons universally imply that preternatural, reddish, ash-coloured, triangular, little membrane, which most frequently grows from the internal angle of the eye, near the caruncula lachrymalis, and gradually extends over the cornea, so as to cause a serious impediment to vision.

Of this disease the celebrated Scarpa has recently published a description, which may be regarded as the most

perfect one extant, and which we therefore feel it to be our duty to incorporate in this comprehensive dictionary.

Though, says Scarpa, the pterygium generally originates from the internal angle of the eye, it is sometimes observed to proceed from the external one, and, in some instances, from the superior or inferior hemisphere of the eye-ball. But whatever be its origin, its figure is invariably that of a triangle, with its base on the white of the eye, and its apex more or less advanced over the cornea, towards the centre of this membrane and of the pupil. Indeed, there are a few cases, in which two or three pterygia of different sizes take place on the same eye, and are arranged round its circumference at interspaces of various breadths. Their points are directed towards the centre of the cornea; and if they should unfortunately conjoin there, the whole of that transparent membrane becomes covered with an opaque veil, and a total loss of sight is the consequence. It seems to Scarpa, that the term *pannus* was applied by the ancients to exactly this sort of complication.

Strictly speaking, chronic varicous ophthalmia, with relaxation, and thickening of the conjunctiva, opacity of the cornea, and the pterygium, only differ in the degree of the disease. In reality, all the three complaints consist of a more or less extensive varicous state of the vessels of the conjunctiva, combined with a degree of preternatural relaxation, and thickening, of that membrane.

In chronic varicous ophthalmia, the extraordinary amplitude and knottiness of the vessels, the flaccidity and thickening of the conjunctiva, are limited to the white of the eye. In opacity of the cornea, certain veins even dilate, and become knotty, for some way, over that delicate layer of the conjunctiva, which is continued over the surface of the cornea. In the pterygium, an extraordinary swelling of this subtle membranous expansion is added to the varicous state of its veins. Hence, the pterygium seems at first like a new membrane formed on the cornea, while it is really nothing more than the delicate continuation of the conjunctiva just mentioned, deprived of its transparency, and degenerated, in consequence of chronic ophthalmia, into a thick, opaque membrane, on which there is a plexus of varicous blood-vessels: consequently, in the case of pterygium, there is no new production on the eye, but only an alteration of one of the thin, transparent membranes, which naturally cover it. The following circumstance, as will be more fully explained presently, illustrates, says Scarpa, the veracity of the preceding statement. The incipient pterygium may be cured in the same manner as opacity of the cornea, viz. by merely cutting off that portion of it, which is situated at the junction of the cornea with the sclerotica, without detaching the whole of it from the surface of the former membrane; just as is practised in opacity of the cornea, in order to destroy the communication of the varicous veins of the conjunctiva with their trunks, the ramifications of which produce and maintain the disease.

Scarpa observes, that the pterygium would be as common a complaint as the varicous chronic ophthalmia, so often occupying the white of the eye, if the delicate continuation of the conjunctiva, over the surface of the cornea, were not naturally of a denser and more compact texture than the rest of the membrane, from which it is produced, and if its vessels were not very minute, and delicate, and not so dilatable as those of the other part of the conjunctiva. This is the reason why the pterygium is comparatively a rare case, in respect to the great frequency of varicous, chronic ophthalmies. But should the vessels of the transparent layer of the conjunctiva once yield to the impulse of the fluid propelled into them; should they once become varicous; the cellular

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cellular texture, in which they are enveloped, never fails to swell gradually, and thus the delicate, diaphanous membrane in question changes into a pulpy, reddish tunic, precisely similar to the pterygium.

That the pterygium is truly nothing else, but the natural, delicate, transparent expansion of the conjunctiva on the cornea, converted, for a certain extent, into a pulpy, flaccid, varicous membrane, may be inferred (continues Scarpa) from the folds which the pterygium and conjunctiva form at the same time, when the morbid eye is turned towards the origin of the disease. The same inference is equally deducible from the tension occasioned in both these parts, whenever the eye is moved in the opposite direction. We become still more convinced of the fact on observing, that in the first position of the eye, both the pterygium, and the corresponding portion of the conjunctiva (which is equally relaxed, varicous, and reddish), may be easily taken hold of with a small pair of forceps, and raised together in the form of a fold.

When the pterygium is met with in the dead subject, on carefully cutting off, and detaching that flaccid and thickened portion of the conjunctiva in the white of the eye, which corresponded to the part of the cornea in the state of opacity, from the pterygium, Scarpa has constantly found, that the pterygium might be separated, with equal facility, both on the white of the eye, and the cornea. The latter membrane was evidently denuded at the seat of the disease, being no longer covered with the transparent continuation of the conjunctiva. But Scarpa has never been able to deprive the cornea of its natural covering, beyond the limits of the pterygium. Also, when several pterygia occur on the same eye, with interspaces between them, as many flaccid, varicous, pulpy places appear in the conjunctiva on the bulb, and constitute the basis of the pterygia; while the rest of this membrane, covering the white of the eye, continues smoothly spread over the ball, and no varicous blood-vessel is perceptible on the anterior hemisphere of the eye, except where the relaxation of the conjunctiva, and the knottiness of the vessels, have implanted, as it were, the distant roots and rudiments of the pterygium.

The pterygium, whether large or small, and whatever its situation may be at the circumference of the eye-ball, constantly retains its triangular shape, with its base on the white of the eye, and its apex on the cornea. The constancy of this fact seems to Scarpa attributable to the increasing degree of firmness, with which the subtile, transparent layer of the conjunctiva adheres to the surface of the cornea, as it proceeds from the circumference to the centre of that membrane. The following consequences must necessarily result from this sort of structure, and the different degree of cohesion actually existing in healthy eyes. 1. The progress of the pterygium must be slower in every instance on the cornea, than on the white of the eye. 2. As the pterygium always meets with augmented resistance, in proportion as it endeavours to approach the centre of the cornea, it must from mechanical necessity assume the form of a triangle, with its base on the white of the eye, and its apex directed towards the centre of the cornea. Forestitus (*Oper. Med.*) has accurately noticed the circumstances of this appearance, and, he continues, "non cooperit oculum nisi in formâ sagittæ."

From this invariable appearance, and figure of the pterygium, one of its principal diagnostic characters results, by which the true disease may be discriminated from false instances, and from every other soft, fungous, reddish excrescence that obscures the cornea. For on this membrane excrescences sometimes form, which, from having the colour and consistence of a soft membrane, bear a very great re-

semblance to the pterygium, though they are really widely different, and, strictly speaking, consist of the texture of the cornea itself, degenerated into a soft, fungous substance. Such pellicles, however, not only almost always create a greater prominence on the cornea, than what accompanies the pterygium, but they are constantly of an irregular tuberous form, and never represent a triangle, with the apex pointing towards the centre of the cornea, like the genuine pterygium.

Another distinguishing character of the pterygium (continues Scarpa) consists in the facility with which the whole of it may be taken hold of with a pair of forceps, and raised into a fold on the cornea. Every other kind of excrescence, attached to this membrane, continues firmly adherent to it, and cannot be folded, and raised from the surface of the cornea, in any manner whatever. This particularity is of the highest importance in the treatment of the disease; for the genuine pterygium may be cured by simple means, while fungous excrescences of the cornea can only be radically removed, and perfectly cicatrized with the utmost difficulty. Plenck very properly observes, on this head: "Pterygia, quæ filamentis solummodò adhærent, facillè abscinduntur, difficillimè quæ ubique accreta sunt corneæ, ac in plicam non possunt." If this excrescence should adhere firmly to the cornea, be of a deep red colour, easily bleed on being touched, and cause shooting pains in the whole eye and temple, though it be of a triangular figure, and constitute the true pterygium, it now threatens to assume a malignant cancerous nature, or has done so already. Hence, in the treatment, it is necessary only to adopt a palliative plan, or else extirpate the whole eye-ball.

The true benign pterygium, says Scarpa, which has a triangular figure, is ash-coloured, or pale-red, is free from pain, and admits of being raised in the form of a fold on the surface of the cornea, may be cured by cutting the opaque triangular little membrane accurately from the surface of the cornea, which is in part covered by it. But as it appears, from what has been said, that the pterygium is nothing but a portion of the delicate, transparent layer of the conjunctiva, converted by chronic varicous ophthalmia into a thick, opaque tunic, it follows, that the pterygium cannot be removed in any way, without the spot, which it occupies on the cornea, being bereft of its natural external covering. Also, as this denudation of the cornea renders a cicatrix unavoidable at the place, it equally follows, that the knife cannot be employed in the cure of the disease, without the cornea being rendered more or less opaque at the part where the pterygium was before situated. Hence, Scarpa cautions young surgeons not to allow themselves to be deceived by the specious accounts of authors, who assert, that they have removed pterygia with the scalpel, and entirely restored to the cornea its former natural transparency. It is true (he says) that, after the removal, and cure, of the pterygium, the cornea at the part affected becomes less opaque than it was before; but the place always continues dim, and clouded with an indelible, though a superficial cicatrix. The amendment derived from the operation cannot but be considerable; by means of the incision, and firm cicatrix, a stop is put to the progress of the complaint, or rather to the increase of the varicous affection, and swelling, of the thin, transparent layer of the conjunctiva, situated on the cornea; the local cause of irritation, and inflammation of the eye, is entirely obviated; and, thus, complete opacity of the cornea is prevented. But should it ever have happened after the resection of a large pterygium, that the patient regained his sight, we are to understand a certain degree of vision; in that proportion (Scarpa wishes to signify) which exists between

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tween a dense membrane, which entirely obstructs the passage of the light, and a slight, superficial cicatrix of the cornea, which does not intercept it altogether.

Scarpa's experience enables him to state, however, that the superficial, indelible speck remaining in the cornea after the recision of the pterygium, is always less extensive than the space previously occupied by the disease. This fact, says he, is a constant one, and, in the vast number of pterygia for which he has operated, some had advanced over the cornea two lines, others two and a half, towards its centre. In all, the scar, and opacity of the cornea, diminished after the cure was perfected, and never exceeded a line and a half, or a little more, in cases in which the pterygia had been two lines in length.

The recision of the pterygium is a very easy operation. For this purpose there is no occasion for a needle threaded with silk, which most surgeons recommend to be passed through the little membrane, in order to make a noose for raising the pellicle, which must be divided at its base. The plan is disadvantageous, as it prolongs the operation considerably, and, particularly, as the bleeding from the punctures prevents the operator from distinguishing, with the necessary clearness, the margin of the parts designed for removal. A pair of dissecting forceps, and a pair of sharp scissars, suffice for this operation.

It is customary (continues Scarpa) to remove the pterygium by making the incision on the cornea, and extending it over the white of the eye, as far as the base of the disease reaches on the conjunctiva; so that when the pterygium grows from the internal angle of the eye, most surgeons continue the section as far as the caruncle. This practice is disadvantageous, first, because it denudes too much of the white of the eye; secondly, because, in consequence of the large portion of the conjunctiva removed at the base of the pterygium, and, in consequence of the direction of the wound, the cicatrix in the white of the eye forms an elevated frænum, which, like a little cord, keeps the eye-ball approximated to the caruncula lachrymalis, and destroys the freedom of its motions, particularly towards the external angle.

To avoid this inconvenience, Scarpa says, he has found it useful, in the treatment of pterygia with bases extending far in the white of the eye, to detach them at their apex, as far as the junction of the cornea with the sclerotica, and then to separate them at their base by a semi-circular incision, comprehending one line in breadth of the substance of the conjunctiva, and made in a direction concentric with the edge of the cornea. Scarpa has observed, that, in this mode of operating, the subsequent cure takes place sooner than when the common method is adopted; the cicatrix occasions no sort of frænum, and the conjunctiva, circularly stretched by the cicatrix, lies smoothly over the white of the eye, and loses that relaxation and varicous state, which are the ground-work of the pterygium. Such attention, however, is not requisite when the pterygium is small, and its base does not extend far in the white of the eye.

Scarpa describes the operation as follows: The patient being seated, an assistant behind him is to elevate the upper eye-lid with the index and middle fingers of one hand, while he depresses the lower eye-lid with the corresponding one of the other. Supposing it the right eye, the operator is to stand, or sit down, just as he prefers, in front of the patient; and the former, after directing the latter to move his eye-ball towards the part corresponding to the base of the pterygium, is to seize the morbid membrane with a pair of forceps held in his left hand, and pinch it into a fold, at about one line from its apex. The duplicature is now to be

raised, and drawn out gently, until a sensation of something giving way is felt, which indicates the detachment of the pterygium from the delicate cellular texture, by which it is connected with the subjacent cornea. Next, by means of a pair of scissars in the right hand, the surgeon must dissect this fold, as closely as possible, from the cornea, proceeding from the apex towards the base of the pterygium. The section being completed to where the cornea and sclerotica meet, the fold is to be again elevated still more, and, with one stroke of the scissars, the pterygium, and the relaxed portion of the conjunctiva, forming its base, are to be detached, as concentrically and closely to the cornea as possible. This second incision will have a semilunar shape, the horns of which ought to extend two lines beyond the relaxed part of the conjunctiva in following the curvature of the eye-ball.

When the operation is finished, the surgeon must promote the hemorrhage, by washing the part with warm water, and then cover the eye that has been operated on, with a pledget of dry lint, or lint moistened in the aqua vegeto-mineralis, supported by a bandage, that does not make too much pressure on the part.

If no particular symptoms arise (continues Scarpa), such as pain, tension of the eye, considerable tumefaction of the eye-lids, it is sufficient to wash the eye, and inside of the eye-lids, three or four times a day with a warm lotion of mallows, and carefully keep these parts from being exposed to the air without compressing them. If the symptoms just mentioned should afterwards occur, the antiphlogistic treatment must be adopted in its full extent, &c.

On the fifth or sixth day, at latest, after the operation, all the surface from which the pterygium was cut appears yellowish, and covered with a fluid, like mucus. This is a mode of suppuration (says Scarpa) peculiar to membranes in general, and particularly to those of the eye. The edges of the wound, and the adjoining part of the conjunctiva, assume a reddish colour. Afterwards the surface of the wound contracts more and more daily, so that at length it completely closes, and the cicatrix forms.

During the whole treatment, subsequent to the operation, there is no occasion to employ any other topical applications but the warm lotion of mallows, three or four times a day. Numerous cases have convinced Scarpa that astringent collyria, and the boasted powders of the Florentine iris and alum, cause great irritation to the eye operated on, and give rise to tumefaction, and a fungus-like state of the conjunctiva, which are impediments to the cure. What is still more inconvenient is, that such means produce fungous excrescences on the middle of the wound itself, which only admit of being repressed and cicatrized with difficulty. Scarpa has seen all these inconveniences arise from one single unnecessary application of the argentum nitratum. On the other hand, when a mere lotion of mallows is the only remedy employed in the treatment, the cure proceeds regularly; the yellowish surface of the incision diminishes daily, and in three, or, at most, four weeks, the wound is quite healed. The vitriolic collyrium, containing a few drops of camphorated spirit of wine, can only be prudently intilled three or four times a day into the eye, for the purpose of strengthening the conjunctiva and its vessels, after the wound is perfectly cicatrized.

We have already repeated Scarpa's sentiment, that the incipient pterygium, strictly speaking, is nothing more than an opacity of the cornea, in which the venous vessels of the conjunctiva covering that part of the cornea, which is the seat of the disease, are somewhat more dilated, than in the case to which the term *opacity* is usually assigned; and, also, that the density and opacity of the delicate layer of

the conjunctiva are much more considerable at the part affected in the instance of pterygium, than in that of simple opacity of the cornea.

The incipient pterygium (adds this author) is not a dense, opaque membrane, but a pellicle as fine as a cobweb, interwoven in different places with varicous blood-vessels, the iris containing tolerably visible behind it. In this early state of the pterygium, it is unnecessary to deprive the cornea of its natural covering; it is quite enough to cut off a portion of it, in order to intercept all communication between the dilated venous ramifications of the pterygium, and the varicous trunks in the white of the eye.

The recision, says Scarpa, is accomplished by cutting out, with a pair of forceps and scissors, a semilunar piece of the conjunctiva, at the point where the cornea and sclerotic conjoin, and exactly at the base of the incipient pterygium, just as is practised for opacity of the cornea. The recent pterygium is observed to disappear gradually after the operation, or to change into a slight dimness of the cornea, extending over a part of the space previously occupied by the disease. This opacity is commonly much more trivial than what follows a cicatrix. Acrell, in his Surgical Observations, mentions having successfully treated an incipient pterygium in this manner. Scarpa has also tried the plan several times with success. Scarpa Sulle Malattie degli Occhi, cap. 11.

PTERYGODIUM, in *Botany*, from *πτερυγιδες*, winged; or *broad-shouldered*; a name expressive of the wing-like aspect of the broad, spreading petals.—Swartz in *Act. Stockh.* for 1800. 217. t. 3. f. E. and in Schrader's *New Journal*, v. 1. 35. t. 1. f. E. Willd. *Sp. Pl.* v. 4. 56. Ait. *Hort. Kew.* v. 5. 197.—Class and order, *Gynandria Monogynia*. Nat. Ord. *Orchideæ*

Gen. Ch. *Cal.* Perianth superior, ringent, of three lanceolate, equal, concave, spreading leaves. *Cor.* Petals two, roundish-obovate, nearly as long as the calyx, spreading, approaching the upper calyx-leaf so as to form a hood. Nectary a lip, various in shape, inserted into the column between the lobes of the anther, reflexed and spreading. *Stam.* Column erect, short, either blunt or pointed; anther of two roundish separate lobes, one at each side of the column, bursting laterally. *Pist.* Germen inferior, oblong, furrowed; style column as above; stigma convex, posterior, at the base of the back of the anther. *Peric.* Capsule of one cell, with three valves. *Seeds* numerous, minute.

Ess. Ch. Lip inserted into the middle of the column, between the lobes of the anther. Petals rounded. Two lower calyx-leaves divaricated, concave. Stigma posterior.

Willdenow, after Swartz, reckons up six species.

1. *P. alatum*. Winged Pterygodium. (*Ophrys alata*; Linn. *Suppl.* 404.)—"Stem leafy. Leaves lanceolate. Lip in three segments; the middle one very short."—Found by Thunberg at the Cape of Good Hope. A small plant, three or four inches high.

2. *P. catholicum*. Inflated Pterygodium. (*Ophrys catholica*; Linn. *Sp. Pl.* 1344. *O. alaris*; Linn. *Suppl.* 404. *Orchidi affinis*, flore luteo; Buxb. *Cent.* 3. 13. t. 21.)—"Stem with two or three oblong pointed leaves. Lip spatulate, pointed, wavy." Native of the Cape. A span, or more, in height, with a few large, concave, yellow flowers.

3. *P. Volucris*. Arrow-lipped Pterygodium. (*Ophrys Volucris*; Linn. *Suppl.* 403. *O. triphylla*; Thunb. *Prodr.* 2.)—"Stem with three ovate leaves. Lip hastate."—Gathered by Sparrmann and Thunberg at the Cape. Introduced at Kew in 1797, by sir Joseph Banks. It flowered in the green-house in June and July. This species is a foot

high. *Leaves* three on the stem, ovate or oblong, pointed, ribbed. *Spike* of many, distant, rather small flowers.

4. *P. caffrum*. Caffre Pterygodium. (*Ophrys caffra*; Linn. *Sp. Pl.* 1344. Thunb. *Prodr.* 2.)—"Stem with about five oblong leaves. Lip very large, two-lobed."—Gathered by Thunberg and others at the Cape. A foot high. *Cluster* of three or four yellow flowers, whose lip is very broad, kidney-shaped and emarginate.

5. *P. inversum*. Cloven-spiked Pterygodium. (*Ophrys inversa*; Thunb. *Prodr.* 2.)—"Stem clothed with sword-shaped two-ranked leaves. Lip lanceolate, divided at the base."—From the same country. *Spike* dense, of many flowers.

6. *P. atratum*. Blackened Pterygodium. (*Ophrys atrata*; Linn. *Mant.* 121.)—"Stem with several linear-setaceous leaves. Lip spatulate, somewhat heart-shaped." Native of sandy ground at the Cape. *Stem* three or four inches high. *Leaves* numerous, distant; the lowermost broadest; the upper longest and narrowest. *Spike* lax, of several distant flowers. The whole plant when dried turns as black as ink, whence the name; but this circumstance is common to many of the *Orchis* family.

PTERYGOID, in *Anatomy*, the name of a process and of a foramen of the sphenoid bone, and of some other parts situated near them. See **CRANIUM**.

The pterygoid nerve is a branch of the superior maxillary going through the pterygoid foramen. See **NERVE**.

PTERYGOIDEUS EXTERNUS, and **PTERYGOIDEUS INTERNUS**, two muscles of the lower jaw, arising from the pterygoid process of the sphenoid bone. See **DEGLUTITION**.

PTERYGO-PALATINE CANAL, is formed between the palate and sphenoid bones, and terminates at the posterior palatine foramen. It transmits the palatine nerve.

PTERYGO-PHARYNGÆUS, a name given to some of the fibres of the constrictor pharyngis superior.

PTERYGO-STAPHYLINUS INTERNUS, the levator palati muscle.

PTERYGO-STAPHYLINUS Externus, the circumflexus palati.

PTILOISIS, from *πίλος*, bald, a loss of the eye-lashes, from disease of the eye-lids.

PTILOTUS, in *Botany, from *πίλωτος*, winged, especially with a dry membranous expansion; alluding to the shining, scariose, permanent bractæas.—Brown *Prodr. Nov. Holl.* v. 1. 415.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Amaranthaceæ*, Juss. Brown.*

Ess. Ch. Calyx in five deep lanceolate segments. Stamens connected at their base, without teeth. Anthers of two cells. Stigma capitate. Capsule without valves, single-seeded, inclosed in the three inner segments of the calyx, which are connected by wool half way up, but naked and spreading above.

This genus consists of annual smooth herbs, with narrow alternate leaves. The flowers are terminal, somewhat capitate, accompanied by three membranous shining bractæas, which remain after the calyx is gone. It is said by its learned author to be very nearly akin to his **TRICHINIUM**; see that article hereafter.

1. *P. conicus*.—Heads solitary, roundish, somewhat conical. Stamens inversely heart-shaped at the summit, contracted in the middle. Leaves linear.

2. *P. corymbosus*.—Heads corymbose. Stamens thread-shaped. Lower leaves lanceolate; upper linear.

Both species were gathered by Mr. Brown in the tropical part of New Holland.

PTINUS, in *Entomology*, a genus of insects of the order *Coleoptera*: antennæ filiform, the last joints larger; thorax

nearly round, not margined, receiving the head. There are thirty-nine species, divided into two sections, depending upon the form of the feelers and lip.

The genus *Ptinus*, like that of *Dermestes* (which see), consists of small insects, which, in general, have similar habits, living both in their larva and complete state among dry animal substances, and some species of dry wood, committing much havoc among the older articles of furniture, which they pierce with innumerable holes, thus causing a slow but gradual destruction.

A. *Feelers clavated.*

Species.

* **TESSELLATUS.** Brown; thorax even; shells slightly tessellate. It is a native of England.

STRIATUS. Brown; thorax uneven, with two ferruginous dots at the base. It is a native of Kiel.

RUFIPES. Black; thorax roundish; shells striate; legs ferruginous. This is found in different parts of Germany.

CASTANEUS. Downy, chestnut; shells striate. It inhabits France.

* **PERTINAX.** Brown, immaculate; thorax compressed. This is found in divers parts of Europe, and is very destructive to wooden furniture and books. When caught it contracts itself and counterfeits death, nor can it be put into motion again by any stimulating means but by the application of great heat.

BOLETI. Brown, opaque; legs testaceous. Inhabits Germany, is on fungi. The body is rarely testaceous.

* **MOLLIS.** Testaceous; eyes black; shells naked. It is of a brick-colour, with dark-coloured eyes. It is found in this country and various parts of Europe, among rubbish; it is extremely destructive to collections of plants, and not to be got rid of but by the heat of an oven. The larva is white, and capable of enduring great cold.

PANICEUS. Downy, ferruginous; shells striate. Found in stale decayed bread.

ABIETIS. Brown, naked; shells testaceous. It inhabits Germany, and is found in the fir-tree.

PLANUS. Brown; thorax plain; shells with crenate striæ. It is a native of Kiel.

CAPENSIS. Ferruginous; shells striate, paler. Found at the Cape of Good Hope.

MINUTUS. Testaceous; thorax rounded; shells sub-striate and pubescent. Found in dried plants brought from Italy.

MICANS. Smooth, brown; shells naked; legs testaceous. Found in some parts of Germany, as is the next.

NITIDUS. Naked, black, polished; legs testaceous.

* **PULSATOR,** or Death-watch. Subvillous, dusky, with irregular grey brown spots. There seems a considerable degree of doubt where to place the death-watch; some will have it to be a species of the *Termes*. Fabricius appears to have supposed it the *dermestes tessellatus*, and Dr. Shaw describes it as the *ptinus fatidicus*: for its curious habits and manners; see our article *DEATH-watch*.

FAGI. Black; antennæ tawny; shells grooved and punctured. It is a native of Berlin.

FERRUGINEUS. Ferruginous; eyes black; shells obsoletely striate. A native of some parts of Germany.

TESTACEUS. Ferruginous, eyes black; shells smooth. A native of Berlin.

FUSCUS. Brown; body speckled with grey; scutellum grey; antennæ ferruginous. Inhabits divers parts of Europe, as do the four following.

RUFUS. Rufous, with a yellow gloss; thorax with a yellow spot on each side behind; the shells are striate and punctured.

FERRUGINOSUS. This also is of a ferruginous colour; the thorax is uneven; shell punctured striate; antennæ reddish.

STRIATULUS. Testaceous; shells lightly striate; the three last joints of the antennæ much larger.

BRUNNEUS. Brown; shells slightly striate, pubescent.

B. *Feelers filiform; lip bifid.*

PUBESCENS. Pubescent, black; shells striate, testaceous. It inhabits France.

GERMANUS. Brown; thorax four-toothed; antennæ and legs ferruginous.

LONGICORNIS. Black, polished; legs yellowish. Found in Germany.

* **FUR.** Testaceous; thorax four-toothed; shells with two white bands. This is a very destructive species to museums, books, furniture, preserved subjects of natural history, and dry seeds. It is finely figured in Shaw's *General Zoology*. It is more than the tenth of an inch long; its colour is pale chestnut-brown, sometimes marked on the wing-coverts by a pair of greyish bands; the antennæ are rather long and slender; the body remarkably convex, and the thorax, when magnified, appears to have a projecting point on each side. It delights in cold and moisture, and is best kept off by heat, but is destroyed most effectually by corrosive sublimate. The female is without wings. The larva has six feet; is soft, thick and hairy. The pupa is inclosed in a glutinous spherical covering.

* **IMPERIALIS.** Brown; the thorax somewhat crenated; the elytra marked with a white blotch, divided into lobes. It inhabits many parts of the north of Europe, as well as this country, and to be found in trees. It is about the size of a grain of wheat. The antennæ are of the same length with the body; the legs are of a rusty colour; the scutellum white; the elytra marked with a white spot, resembling the eagle worn on the imperial standard; whence it has obtained its specific name.

CRENATUS. Brown; thorax gibbous; shells with crenate striæ, immaculate. It is a native of Germany, and less than the *P. fur*.

LATRO. Testaceous, immaculate; thorax two-toothed. Found at Strasburg.

DENTICORNIS. Black; shells striate; antennæ serrate. Native of Paris.

SERRICORNIS. Thorax gibbous, deflected; body testaceous; antennæ serrate. Found among the dried herbs from America.

SPINICORNIS. Oblong, two lower joints of the antennæ longer and spinous. Found in the Sandwich islands.

SULCATUS. Whitish; thorax downy, with four grooves; shells connected, brown testaceous, polished. Found in dried plants brought from the Canary islands.

SCOTIUS. Thorax naked, pitchy; shells connected, brown testaceous, polished. It is found on the birch in different parts of Europe.

STRIATUS. Thorax gibbous, with two tubercles; shells globular, striate. It inhabits Saxony.

UPSALIENSIS. Testaceous; eyes black; shells striate; thorax plano-convex. Found at Upsal.

FABER. Dull testaceous; shells naked, waved with cinereous. A native of Holland.

APTERUS. Head brown; front channelled; shells, legs, and antennæ rufous; thighs clavate; shanks ciliate.

PTISAN, **PTISANA,** πτισαν, in the *Materia Medica*, a cooling potion usually made of barley boiled in water, and sweetened with liquorice, &c.

To these are sometimes added the roots of quick-grass, and

and sometimes senna, to render it laxative. Most of the decoctions of physicians are called *ptisans*. Feverish patients are prohibited wine, &c. and reduced to ptisans.

PTISCIANA, in *Ancient Geography*, a town of Africa, in the interior of Mauritania Tingitana. Ptol.

PTOLEMAIC SYSTEM, or *Hypothesis*. See SYSTEM.

PTOLEMAIC Sphere. See SPHERE.

PTOLEMAIS, in *Ancient Geography*, one of the towns of Phœnicia, situated 32 miles from Tyre, according to the Itinerary of Antonine. Its ancient name was Acco or Aco. See ACRE.—Also, a town of Egypt, in the Thebaid, according to Strabo, who says that its government was formed after the model of the republics of Greece. Ptolemy calls it Hermii, and says that it was the capital of the Thinite nome.—Also, a town of Africa, in Cyrenaica, according to Strabo, Pliny, and Steph. Byz.—Also, a town of Ethiopia, upon the Arabic gulf, according to Pomponius Mela. Pliny names it Epitheras, and places it on the borders of the lake Monoleus, adding, that it was built by Philadelphus, at the distance of 4820 stadia from Berenice, on the coast of the Red sea.—Also, a town of Asia Minor, in Pamphylia. Strabo.—Also, a port of the town of Arsinoe, in the Arsinoite nome, in Egypt, according to Ptolemy.

PTOLEMAITES, in *Ecclesiastical History*, a branch of the ancient Gnostics, so called from their leader Ptolemy, a man of considerable learning, who improved greatly on the system of the Gnostics his predecessors, and enlarged it with a number of notions and visions of his own.

The Ptolemites were properly a branch of the sect of the Valentinians, which sprung up towards the close of the second century, under Ptolemy, who differed in opinion from his master Valentine, with respect both to the number and nature of the æons.

St. Epiphanius is very full on the subject of the Ptolemites, and produces a letter of Ptolemy to Flora, in which that heretic lays down his doctrine. He maintained, that in the law of Moses there were three things to be considered, inasmuch as it did not all come from the same hand; but part of it, said he, from God, part of it from Moses, and part of it from neither of them, but from the pure traditions of the ancient doctors: on which last part it was that he founded his dreams.

PTOLEMY, surnamed *Lagus*, and *Soter*, in *Biography*, king of Egypt, was a native of Eordæa, in Macedonia; he was probably a natural son of king Philip, who gave his mother, Arsinoe, when pregnant by him, in marriage to Lagus, a Macedonian of mean descent. He passed for the real son of Lagus, from whom that dynasty of Ptolemies were called Lagides. He was brought up to arms, and became one of the most celebrated officers of Alexander the Great, whom he accompanied in all his expeditions. He particularly distinguished himself in the war against the nations on the Indian border, and had a great share in the successes of his sovereign. On the division of the Macedonian empire at the death of Alexander, the government of Egypt, with part of Arabia and Lybia, were assigned to Ptolemy. His administration of that province was so wise and equitable, that many resorted to it from Europe and Asia, and by the honours which he paid to the remains of Alexander, when conveyed to Egypt for interment, he attached to himself many of the veteran soldiers of that conqueror. When Perdiccas began to manifest his ambitious designs, Ptolemy joined in a league with Antipater and Craterus to keep him within bounds; and when Antipater made a new division of the provinces, Ptolemy was confirmed in the government which he possessed, and which in-

deed could not be taken from him. He afterwards possessed himself of Syria and Phœnicia. He met with very little opposition in this attempt, except from the Jews, whose resistance obliged him to lay siege to their capital, Jerusalem. This city he took by storm on the sabbath-day, the religion of the inhabitants not permitting them, on that day, to make use of the means of self-defence. He sent a number of Jews as captives into Egypt, of whom he selected those fitted to his purpose to serve in his garrisons, and placed the rest in the conquered countries of Lybia and Cyrene. He afterwards, together with Lyfimachus and Cassander, formed a confederacy to support Seleucus against the power of Antigonus, who took Syria from Ptolemy, and laid siege to the Phœnician sea-ports, which he reduced. Being obliged, however, to carry his arms elsewhere, Ptolemy marched into Syria, and defeated Demetrius, the son of Antigonus, and recovered all that he had lost. A defeat, given by Demetrius to a general of Ptolemy's, produced another change of fortune, and Ptolemy retreated to Egypt, with a great quantity of spoil, and a numerous body of people who were desirous of living under his protection. Peace was restored, and soon after broken: Ptolemy now made incursions into Cilicia, and conquered the greater part of the island of Cyprus. He then obtained various successes in Lesser Asia and the Archipelago, and attempted to gain the hand of Cleopatra, the sister of Alexander; but upon the bare suspicion of the princess's intentions in his favour, she was put to death by order of Antigonus. His career was stopt by the activity of Demetrius, who defeated him in a sea-fight, and reduced the isle of Cyprus. On this occasion the conqueror assumed the title of king, and conferred the same on his son, and his example was followed by Ptolemy, and the other Macedonian chiefs. This happened in the year 306. Antigonus and Demetrius now resolved to attempt the entire conquest of Ptolemy's dominions, and accordingly invaded Egypt with a powerful armament by sea and land; but Ptolemy was too prudent and skilful to allow them to carry their plans into effect. They turned their arms against Rhodes, but by the assistance of Ptolemy that city was saved, and the inhabitants, for his services, honoured him with the appellation of *saviour*. Ptolemy, in his turn, became the aggressor, and Antigonus was killed in battle, while Demetrius underwent a total defeat. Ptolemy now recovered the isle of Cyprus, and captured in Salamis the mother and family of Demetrius, whom he dismissed with magnificent presents. He regained likewise part of Syria and Phœnicia. At length, having arrived at an advanced age, he devolved the cares of government upon his son Ptolemy Philadelphus, associating him in the throne, and declaring him his successor, to the prejudice of an elder son by another wife. He survived two years longer, and died in the year 283 B.C. in the 84th year of his age, having reigned more than forty years. Ptolemy Soter, says the historian, was one of the greatest of Alexander's successors, and the best prince of the line which he founded. His reign, on the whole, was highly prosperous, and at his death his kingdom was very extensive; besides Egypt and its dependencies, he held Phœnicia and Cœlo-Syria, Lybia, Pamphylia, Cilicia, Syria, Caria, and some of the Cyclades. The seat of his kingdom was the new city of Alexandria, which he rendered populous by inviting inhabitants from various countries, and bestowing on them great privileges. He built the famous Pharos, or light-house, at the entrance of its port, and founded an academy or society of men of letters, for whose use he began that collection of books, which afterwards became celebrated through the world as the Alexandrian library. He was himself a man of un-

questionable

questionable learning, and composed a history of the conquests of Alexander, which was regarded by Arrian as the best authority for the events of that splendid period. While on the throne he retained the simplicity of manners and familiarity which had distinguished him as a soldier. His government was mild, prudent, and equitable, so that his dominions were the refuge of numbers who fled from the disorders, and oppressions prevailing in other parts of the Macedonian empire. He had been four times married; his two last wives were Eurydice, the daughter of Antipater, and mother of Ptolemy Ceraunus; and Berenice, by whose charms he was so captivated in advanced life, that he consulted her on all occasions, and made her son his heir. Univer. Hist.

PTOLEMY PHILADELPHUS, king of Egypt, son of Berenice, began to reign, as we have just observed, during the life-time of his father, and in 281 B.C. succeeded him as sole monarch. Soon after his succession he banished the philosopher Demetrius Phalereus, a miserable act of revenge, whom he suspected of having advised his father to nominate as his successor, his eldest son Ptolemy Ceraunus. The name Philadelphus appears to have been assumed by this king in compliment to his brother Ceraunus, after the latter had sent him an embassy expressing his desire to live on friendly terms with him, notwithstanding his disappointment in the succession. Philadelphus had, as has been seen, received a powerful and opulent kingdom, which placed him among the greatest sovereigns of the times. He had married, as his first wife, Arsinoe, the daughter of Lyfimachus, whom he repudiated, and then married his own sister, who was the widow of their half-brother Ceraunus; such was the custom of the royal families of the Macedonian race. He now formed an alliance with the Romans, the Athenians, and Lacedæmonians, and sent a fleet to the relief of Athens when besieged by Antigonus Gonatus. The general tranquillity of his reign was interrupted by the revolt of his maternal brother Magas, whom Ptolemy Soter had made governor of Lybia and Cyrene. Magas, with a numerous army, advanced towards Alexandria with a view to dethrone Ptolemy, but was recalled to his own government by a revolt of the Marmarides. Afterwards, in conjunction with his father-in-law, Antiochus Soter, king of Syria, he renewed his design; but Ptolemy was before-hand with him, and defeated all his plans. It was chiefly through the policy of Philadelphus that Alexandria became so celebrated for its commerce. He founded a city on the Red sea, near the frontier of Ethiopia, which he named, after his mother, Berenice, but finding its harbour inconvenient, he removed the trading station to Myos-Hormos, on the same sea. To this port were brought the commodities of the East, whence they were transferred on camels to Coptos on the Nile, and thence to Alexandria; and, in order to facilitate the passage across the desert, he carried a canal into it from the Nile for the supply of water, and built houses of accommodation at proper intervals. He likewise, for the protection of trade, kept two strong fleets, one on the Red sea, the other in the Mediterranean, in the last of which were some vessels of extraordinary magnitude. By these prudent measures, he rendered his kingdom flourishing, his people happy, and he filled the country with a number of populous towns and cities. Upon the death of Magas, his widow excited a war between her brother Antiochus Theos and Ptolemy, which produced a formidable invasion of Egypt by the Syrian king.

This war did not prevent Ptolemy from pursuing those plans of liberal munificence which have rendered his name illustrious. He employed learned men to collect books from all quarters for his great library, and it is said to have been

in consequence of his literary curiosity that the SEPTUAGINT (which see) was made; though the manifest fables with which the narrative of this transaction is mingled, have thrown doubts upon the whole. His generosity as a man and patron of letters, drew to his court many eminent persons in various branches, among whom were seven Greek poets, from their number popularly called the Pleiades. He was also the greatest collector, in his age, of the productions of the fine arts, which he purchased by means of his agents throughout Greece. After the death of his sister-wife, his affliction was unabating, and he perpetuated her memory by giving her name to several cities, and raising sumptuous monuments to her honour, nor did he long survive her loss. Ptolemy died in the year 246 B.C. leaving two sons and a daughter by the first wife. He was not of an amiable temper or character, though splendid in all his acts as a public man. He was indolent, luxurious, and effeminate; though he adopted the surname of Philadelphus, he put to death two of his brothers on suspicion of conspiracies, whence some writers have supposed the application of the name to be irony. His reign forms a kind of era in letters and the arts, and few monarchs have established a more lasting reputation arising from their encouragement. Univer. Hist.

PTOLEMY EUERGETES, son of the preceding, succeeded to the throne of Egypt in the year B.C. 246. Soon after his accession, his sister Berenice, widow of Antiochus Theos, king of Syria, being, with her infant son, reduced to the most imminent danger by Laodice, the first wife of that king, Ptolemy marched with an army to her succour, but before his arrival, they were taken and put to death. In revenge, he not only seized and put to death Laodice, but made himself master of Syria, Cilicia, and all the country to the Euphrates. He then passed that river, and reduced Mesopotamia, Babylonia, and, it is said, the whole tract as far as Bactria and the confines of India. Being called by a revolt in Egypt, he brought back an immense booty in gold and silver, and also a vast number of Egyptian idols which had been carried away by Cambyfes. These he replaced in their temples, and hence he acquired, among his superstitious subjects, the surname of Euergetes, or the Benefactor. When Ptolemy set out on this expedition, his queen Berenice made a vow to consecrate her beautiful hair to the gods in case he should be returned to her in safety. She fulfilled her vow, but through the negligence of the priests it was soon lost. To avert the king's wrath, Conon, the celebrated mathematician, feigned that the locks had been transported into the heavens, and formed a group of stars near the tail of the lion. To this new constellation, as he called it, he gave the name of *Berenice's Hair*, by which it is still known. After this Ptolemy made an expedition southwards, which in the end gave him possession of all the coasts of the Red sea on the Arabian and Ethiopic sides, down to the straits of Babelmandel. He died in the year 221 B.C. This king, says the historian, inherited the love of learning which distinguished his progenitors, and employed much care and expence in augmenting the Alexandrian library. He entertained men of literary eminence at his court, and having been a pupil of the celebrated Aristarchus, was himself eminent in letters, particularly in historical composition. Univer. Hist.

PTOLEMY PHILOPATOR, king of Egypt, succeeded his father Euergetes, assuming his name, *lover of his father*, for reasons that cannot now be ascertained. He was a vicious, dissolute, and cruel prince: one of his first acts, after his accession, was to put his brother Magas to death, because he was supposed to be too much loved by the army. Ptolemy was soon involved in a war with Antiochus the Great, king

PTOLEMY.

of Syria, who attempted, but unsuccessfully, to recover the provinces of Cælo-Syria and Palestine, which had been detached from the Syrian crown by Euergetes. A peace soon followed, in which the contended provinces devolved to Ptolemy, and on this important occasion he visited all their principal cities, and among the rest Jerusalem, where he offered sacrifices, and made rich presents to the temple. Being resisted by the priests in his attempt to enter the Holy of Holies, he returned to Alexandria so much exasperated against the Jewish nation, that he determined to deprive them of their privileges. A rebellion which broke out in Egypt was the cause of the destruction of a number of Jews, which Eusebius records about this period, representing them as fighting on the royal side. Philopator, in the ninth year of his reign, made an alliance between Egypt and Rome: his queen brought a son, after having been childless a great number of years. In joy for this event he gave himself up to all sorts of debaucheries; his queen remonstrated, and to prevent her interference, he caused her to be assassinated. He is also represented as having put his own mother to death: and according to history, he was unquestionably a most detestable sovereign. But he was not, however, without some good qualities: the love of learning, which was hereditary in his house, was eminently displayed in his character, and he gave some meritorious instances of munificence. He died in the year 204 B.C., after a reign of about seventeen years.

PTOLEMY EPIPHANES, king of Egypt, son of the preceding, was only in his fifth year when he succeeded to the throne. During his minority, Antiochus the Great having formed an alliance with Philip, king of Macedon, for the partition of the Egyptian dominions, invaded and took Cælo-Syria and Palestine. Ptolemy's guardians thereupon sent an embassy to Rome, imploring the protection of the republic, and M. Lepidus was deputed by the senate to go to Egypt, and assume the direction of affairs. When the young king assumed the reins of government, he fell under the government of courtiers, who ministered to his vicious inclinations, and subverted the influence of Aristomenes, who had been in the habit of giving him faithful advice. This he continued, which Ptolemy so much resented, that he caused him to be put to death. His administration became so odious and tyrannical, that a conspiracy was formed among his subjects, which had nearly effected his deposition. By means of another able minister, Polycrates, he was extricated from the danger, but he manifested his treacherous disposition, by cruelly executing the conspirators, after they had submitted upon the promise of a pardon. He cultivated a strict friendship with the Romans, to whom he offered succours in their war with Antiochus, although he had married Cleopatra, the daughter of that king. He also maintained a strict connection with the Achaian republic, and one of his last acts was to send an embassy, inviting it to a league, offensive and defensive. As he was preparing to make war against Seleucus, king of Syria, he was poisoned by his nobles and principal officers, who suspected that he meant to defray the expences of the war with their fortunes. This occurred in the year B.C. 180, in the 24th year of his reign. Univ. Hist.

PTOLEMY PHILOMETER, and PTOLEMY PHYSCON, kings of Egypt, sons of the preceding, both minors at their father's decease. Philometer, at the age of six, was declared successor to the crown, under the guardianship of his mother Cleopatra. She had the conduct of the regency during eight years, but after her death the young king was dethroned, and his brother Physcon was declared sovereign. Physcon, who assumed the name of Euergetes II., was expelled by Antiochus, who replaced Philometer on the

throne. The two brothers were then persuaded to reign in conjunction. They did not, however, live in concord, and Physcon dethroned his brother. The latter proceeded to Rome in a mean garb, and with a few attendants, in order to excite compassion; and representing his wrongs before the senate, they deputed two of their body to conduct him back and restore him. They accommodated the difference by decreeing the possession of Egypt to Philometer, and that of Libya and Cyrene to Physcon. The latter, afterwards, by a journey to Rome, obtained a decree for the addition of Cyprus to his share, which island had before been common to the brothers. Philometer, not choosing to acquiesce in the decree which deprived him of his share of Cyprus, opposed his brother with an armed force in the island, and took him prisoner: in this case he displayed a truly fraternal spirit, and not only pardoned the hostility, but restored to him Libya and Cyrene, which he had lost, and added some territories in lieu of Cyprus. After this, Philometer was engaged in a contest with ALEXANDER BALAS, (see his article,) in which he lost his life, in the year B.C. 145. He is highly extolled by historians, as well for his benevolence as clemency. By his wife and sister Cleopatra, he left a son and two daughters. Upon the death of Philometer, Physcon prepared to assert his claim to the succession. By the mediation of the Roman ambassador, an accommodation was effected, on condition that Physcon should marry Cleopatra, and reign jointly with her, while her son should be considered as heir to the throne. Physcon, however, murdered the son on the very day of the nuptials; and the remainder of his reign is represented by historians as one of the most sanguinary that ever afflicted the human race. He so depopulated Alexandria by his bloody executions, that he was obliged to invite strangers from all parts to re-people it. It would disgust the reader to mention but a small portion of the cruel acts which he perpetrated. He lived the scourge of the human race, and the curse of his own people, till the year 117 B.C. Tyrant as he was, he had the reputation of being a great patron and promoter of learning, and even such a proficient in letters, as to have obtained the title of Ptolemy the Philologist. He enriched the Alexandrian library with a great number of books, collected at a vast expence; and himself composed a historical work, regarded as a commentary on Homer. There were other Ptolemies of Egypt, but they do not seem worthy of record. Univ. Hist.—We shall, however, on account of his attachment to music, mention

PTOLEMY AULETES, the father of Cleopatra, and the last of the Ptolemies who reigned over Egypt. This musical prince derived his cognomen of Auletes, the flute-player, from his excessive attachment to that instrument.

Strabo (lib. xvii.) says of him, that besides his debaucheries, he applied himself in a particular manner to playing the flute. He had such an opinion of his own abilities, as to institute musical contests at his palaces, and had there the courage to dispute the prize, publicly, with the first musicians of his time; and as the dress of players on the flute among the ancients was peculiar to that profession, this prince submitted to wear the robe, the buskins, the crown, and even the bandage and veil of a tibicen, as may be seen on a beautiful anethyst in the king of France's possession, of inestimable value, which is supposed to have been engraved by command of this prince, and worn by him to gratify his vanity on account of his musical excellence. Indeed the surname of Auletes is seriously given to him by Cicero, and by Strabo. The first in his defence of Rabirius Posthumus; and the second, who was likewise his contemporary, never mentions him but by the title of Auletes. He had likewise an opprobrious appellation given to him, by his own subjects,

in the Egyptian language, of the same import, being called *Phothingos*, or *Phothingios*, from *Phothinx*, *Monaulos*, or single flute. His violent passion for music, and for the company of musicians, gained him the name of ΝΕΟΣ ΔΙΟΝΥΣΟΣ, *the new Bacchus*.

A melancholy truth forces itself upon the mind in reading the history of this prince, and that of the emperor Nero, whom he very much resembled, which is, that, if the heart is depraved, music has not the power to correct it. And though these musical princes obtained prizes in the public games, they acquired no honour to themselves, nor did they reflect any upon the profession of music. A musician is so distant in character and dignity from a sovereign prince, that the one must stoop too low, or the other mount too high, before they can approximate; and the public suffers with equal impatience, a sovereign who degrades himself, or an artist who aspires at a rank above his station in the community.

An inordinate love of fame, or a rapacious desire of monopolizing all the glory as well as goods of this world to themselves, must have incited these princes to enter the lists in competition with persons so much their inferiors: a passion that should always be distinguished from the love of music, which they might have gratified, either from their own performance, or from that of others, in private, much more commodiously than on a public stage.

PTOLEMY, CLAUDIUS, a celebrated Egyptian geographer, astronomer, and mathematician, was born at Pelusium, about the year 70 of the Christian era. He taught astronomy at Alexandria, where he flourished under the reigns of the emperors Marcus Antoninus and Adrian. Many of his observations were made between the years 125 and 140. He has always been regarded as the prince of astronomers among the ancients, and in his works he has left us an entire body of science. We are indebted to him for preserving and transmitting to us the observations and principal discoveries of the ancients, enriched and augmented by his own. He corrected Hipparchus' catalogue of the fixed stars, and he formed tables, by which the motions of the sun, moon, and planets might be calculated and regulated. He digested the observations of the ancients into a system entitled Μεγάλη Σύστασις, or *Great Construction*. In this he has adopted and exhibited the ancient system of the world, which placed the earth in the centre of the universe, and this has been called, after him, the Ptolemaic system, to distinguish it from those of Copernicus and Tycho Brahe. By order of the kings of Arabia, in 827 this work was translated into Arabic, in which language it was called *Almagestum*, and from the Arabic it was translated into Latin about the year 1230, under the patronage of the emperor Frederic II. There were also other versions of it from the Arabic into Latin. The Greek text was first printed at Basil in 1538, and accompanied with eleven books of commentaries by Theon, who flourished at Alexandria in the reign of the elder Theodosius. In 1541 it was reprinted at the same place, and again in 1551, with other works of Ptolemy. An abridgment of it was made by Purbach, and John Muller, with valuable commentaries by the latter, and published at Basil in 1543, in folio. (See *ALMAGEST*, and *PTOLEMAIC System*.) Another important work of Ptolemy was his "*Geographiæ, libri vii.*" in which he informs us that he followed the geography of Marinus of Tyre, but with numerous additions and corrections, with respect to the longitudes and latitudes of places, as well as the boundaries of countries and provinces in different quarters of the world. Ptolemy was the first who searched out and marked the situations of places according to their latitudes and longitudes: and though, for want

of observations, it is far from being perfect, yet it has been found very useful to modern geographers. There are other works of Ptolemy still extant, such as "*Quatuor Libri de Apotelesmatibus et Judiciis Astrorum:*" "*Fructus Librorum suorum, centum Aphorismis Astrologicis,*" which was a sort of supplement to the preceding; "*Recensio chronologica Regum a Nabonassoro Assyriorum, Medorum, Persarum, Græcorum, et Romanorum usque ad Antoninum Pium:*" "*De Apparentiis et Significationibus Stellarum inerrantium;*" "*De Analemate:*" "*De Hypothesi Planetarum Liber;*" "*Planisphærium;*" "*Elementorum Harmonicorum,*" of which the best edition in Greek and Latin, accompanied with the commentaries of Porphyry, was first published at Oxford, by Dr. John Wallis; and "*De iudicandi Facultate et Animi Principatu,*" published at Paris, in Greek and Latin, in 1603.

Ptolemy ranks as high amongst the great writers of antiquity for his Harmonics, or theory of sound, as for his *Almagest* and Geography.

Every writer on the subject of music, till the time of Ptolemy, regarded the fourth as the *first* concord, and dividing all the fifteen modes into tetrachords, regulated the scale in all the genera by that interval. But Ptolemy, about the year one hundred and thirty of the Christian era, and four hundred and fifty years from the time in which Aristoxenus flourished, proposed a new doctrine and reform in the ancient musical system; in which he reduced the fifteen modes to seven, and made the diapason, or octave, the regulator of his scales, not by abandoning the tetrachords, for he regulated the genera by those intervals in the same manner as his predecessors; but in his reduction of the modes he kept them within the bounds of the octave, and made their number equal to the species of diapason. The ancient names of Dorian, Hypodorian, Lydian, Hypolydian, Phrygian, Hypophrygian, and Mixolydian, he retained, as well as their relative places or distances from each other; but it has been misrepresented as his intention to alter the pitch of all the modes, by raising the proslambanomenos of each a fifth higher. The only ground for this opinion is in the eleventh chapter of his second book, where having occasion to exemplify, in *some one* octave, the manner in which the *meses* of his seven modes would occupy all its notes, he chose that octave between e and E, as he says himself, preferably to any other part of the Greek scale, on account of its convenience; as it was situated in the middle of the scale and voice. But there is not the least reason to conclude that he meant to propose any *reform*, or to disturb, in *this* respect, the established doctrine and practice.

Dr. Wallis, who has translated into Latin the Harmonics of Ptolemy, and reduced his modes to modern notation, makes them all consist of transpositions of the Dorian mode, which Ptolemy calls the first, and which Dr. Wallis, after him, has written in the minor key of A natural, placing it in the part of the scale which in *practice* belonged to the hypodorian.

Dorian Hypod. Phrygian Hypophrygian
1 5 6 7

By this disposition of Ptolemy's modes, it seems as if his design had been to establish a more easy and obvious relation and connection between them, than had been hitherto practised; for though the modes placed above and below the five principal ones might have been originally intended as their adjuncts, yet from the multiplicity and promiscuous arrangement of the modes at the distance only of a semitone above each other, their intimate relation and union had not been sufficiently attended to. He therefore included all his seven modes in the compass of an octave, "making," says Dr. Wallis, "the Dorian the centre or mean; after which he placed the mixolydian a fourth above the Dorian; the hypolydian a fifth below the mixolydian; and the Lydian a fourth higher than the hypolydian. Then, beginning again at the Dorian, he placed the hypodorian a fourth below it; the Phrygian a fifth above the hypodorian, and the hypophrygian a fourth below that." But this round-about order of the modes is not that of Ptolemy; for in his tenth book, chap. ii. the title of which is, *How to adjust accurately the Distances of the Modes*, he gives his method of taking them by fourths and fifths in the only direct and warrantable way in which they can be taken, according to modern modulation, by beginning at the mixolydian: D, A, E, B, F*, C*, G*. Now if each of these modes produced seven species of diapason or octave, the seven modes of Ptolemy would furnish seven times seven, or forty-nine species of octave; not indeed all of different kinds, but of different pitch in the scale. To each of these modes he assigned the compass of a diadiapason, or double octave, as was the practice in the ancient modes; with this difference, that the first and characteristic sound in the fifteen modes was proslambanomenos, but in those of Ptolemy mese is made the key note, and the centre of the scale; which may be supposed to extend an octave above, and an octave below the sound given in the table.

We know not, indeed, what was the success of Ptolemy's reformation during his life: a reformation, it must be owned, that had something Calvinistical in it; a zeal for tearing; and yet, strange to tell! all the traces to be found of it are in the modes of the Romish church, established long after, but which resemble those of Ptolemy in nothing except their number and names. Ptolemy's modes are manifestly transpositions of the scale into *different* keys: the ecclesiastical, only different species of octave, in *one* and the same key.

This great astronomer, geographer, and musician, whose peculiar use of the species of octave, and reformation of the modes which we have just given, appears to have been less shackled by authority, and a more bold and original thinker on the subject, than most of his predecessors; indeed he was not insensible of his own force and superiority, for he treats all former musical writers and their systems with little ceremony. Some parts of his disputes and doctrines are now become unintelligible, notwithstanding all the pains that our learned countryman Dr. Wallis bestowed on him near 120 years ago, particularly his third book, which forms a very striking contrast with the scientific solidity and precision of the two first. The instant he sets foot within his beloved circle, the magic of it transforms him at once from a philosopher to a dotard. He passes suddenly from accurate reasoning and demonstration, to dreams, analogies, and all the fanciful resemblances of the Pythagorean and Platonic schools: discovers music in the human soul, and the celestial motions: compares the rational, irascible, and concupiscent parts of the soul, to the 8th, 5th, and 4th: makes the sciences, and the virtues, some diatonic, some chromatic, and some enharmonic: turns the zodiac into a lyre, making the equinoctial the key-note of the Dorian

mode: sends the mixolydian to Greenland, and the hypodorian to the Hottentots!

He seems to have been possessed with an unbounded rage for constructing new scales, and correcting those of former times. He gives us no less than eight different forms of the diatonic scale, three of which were his own; the other five went under the names of more ancient musicians of great renown; such as Archytas of Tarentum, Aristoxenus, Eratosthenes, and Didymus. Most of these scales seem but to differ in deformity, according to our present ideas of harmony and temperament. Indeed there is only one of them which modern ears could suffer, and concerning that it is necessary to be somewhat explicit.

Euclid, who first discovered that six major tones in the ratio of $\frac{9}{8}$ were more than sufficient to fill up the octave, gave two major tones and a limma to his tetrachord; which made the major thirds intolerable. Didymus was the first who discovered that whole tones were of two kinds, major and minor; and, giving to his minor tone the ratio of $\frac{16}{15}$, divided his tetrachord into major semitone $\frac{1}{2}$, minor tone $\frac{16}{15}$, and major tone $\frac{9}{8}$, including the whole series in the usual bounds of a true fourth $\frac{4}{3}$. This arrangement has been censured by Padre Martini, and with reason, if a major key and counterpoint had been in question; but, as the abbé Roullier justly observes, a minor key, and simple melody, were alone considered at that time. The minor tone, from C to D, therefore had this convenience, that it rendered D a true 5th below mese, the central string of the lyre, which regulated the whole system, and to which all the other strings were tuned, as well as the octave above proslambanomenos, the fundamental note of every mode. (See Dissert. p. 9.) When the major tone is from C to D, and the minor from D to E, as in Ptolemy's arrangement, this cannot be the case; for then the 5th from D to a, will contain only two minor tones, one major, and a major semitone, instead of two major tones, one minor, and a major semitone, of which every perfect 5th, in the ratio $\frac{3}{2}$, is composed.

Ptolemy, nearly two centuries after Didymus had suggested the major semitone, and minor tone, adopted them in one of his divisions of the diatonic 4th, but changed the place of the minor tone, arranging his intervals, suppose them to be these, B C D E, in the following order and proportions: major semitone $\frac{1}{2}$, major tone $\frac{9}{8}$, minor tone $\frac{16}{15}$, which, together, completed the fourth in the usual, perfect, constant, and true ratio of $\frac{4}{3}$; and these are the famous proportions of the intervals proposed in that system of Ptolemy which is known to theorists by the name of *diatonium intensum*, or sharp diatonic; and which, long after his time, was received in our counterpoint, and is pronounced by Dr. Wallis, Dr. Smith, and the most eminent writers on harmonics, to be *the best division of the musical scale*. The intervals of our C natural, when made perfect, are in the following proportions, ascending: 1, $\frac{9}{8}$, $\frac{7}{6}$, $\frac{5}{4}$, $\frac{4}{3}$, $\frac{3}{2}$, $\frac{2}{1}$; that is, giving to the octave three major tones, two minor tones, and two major semitones, arranged in this order: from the key-note to the 2d of the key, a major tone; from the 2d to the 3d of the key, a minor tone; from the 3d to the 4th, a major semitone; from the 4th to the 5th, a major tone; from the 5th to the 6th, a minor tone; from the 6th to the 7th, a major tone; and from the 7th to the octave, or 8th, a major semitone. And no sharp key can be perfect, but by being tuned in the same manner; and yet, where to place the minor tone has occasioned endless disputes among writers on temperament. De Moivre, in his *Doctrine of Chances*, gives 210 permutations to these intervals T, T, T, t, t, H, H.

This arrangement of Ptolemy has been considered by some

some writers as a temperament, on account of his departing from the just proportion of some of the 5ths, in order to give perfection to 3ds and 6ths. This temperament, however, if it may be so called, is become to us the standard of perfection, and every deviation from it, in the modern sense of the word, is now called temperament. If temperament implies *imperfection*, and the alteration of intervals from those proportions which best satisfy the ear; and if those scales are the *most*, though not the *best* tempered, which most offend the ear, the word is in that sense chiefly applicable to the old Pythagorean diatonic, adopted by Euclid, and to the other numerous divisions above mentioned.

The scale of the Pythagoreans was indeed founded upon some principle; being, as the abbe Rouffier has shewn, produced by a series of perfect 5ths; but the other divisions seem to have been the produce of random experiment, and unmusical calculation, and were as various and unfit for use, as want of principle could make them. Scarce any rule seems to have been observed, but that of keeping the *soni stantes*, the boundaries of the tetrachords, unmoved from their just ratio of $\frac{4}{3}$. The ancient theorists revenged themselves, however, for this confinement by every kind of licence in the disposition of the two remaining sounds: the various tunings of which constituted what they called the *χρῶμα*, the colours or shades of the three genera. In these, all kinds of intervals seem to have been admitted, provided they were but *rational*, that is, *expressible by numbers*.

Aristoxenus did not confine himself even to this rule; for his equal divisions were neither reducible to rational numbers, nor were the vibrations of his intervals, if they could have been put in practice, commensurable. Music, however, was more obliged to him for the invention of a method which it must be allowed left every thing to the guidance of the ear, uncertain as it may be, than to those mathematical speculators who furnished it with so many accurate and demonstrable rules for being infallibly out of tune. Indeed, it is probable, that among the ancients, as well as the moderns, many such untuneable divisions, served more to amuse theorists, than to guide practical musicians.

Ptolemy having a facility, and perhaps a pleasure, in calculating, seems to have sported with the scale, and wantonly to have tried confusions, by dissecting and torturing it in all possible ways; and though one of his many systems suits our present practice, it is not to be imagined that it was designedly calculated for the use of counterpoint, which was far from his thoughts. It seems, however, as if music in parts was first suggested by this arrangement of the intervals; for the 3ds and 6ths, which were before so harsh and crude as to be deservedly ranked among the discords, were now softened and sweetened into that grateful coincidence with which modern ears are so much delighted. It was impossible, after hearing them, for lovers of music not to feel the charms arising from the combination and succession of these consonances; and it was from this time that the seeds of that harmony which may be said, in a less mysterious sense than that of Pythagoras, to be implanted in our nature, began to spring up. They were certainly of slow growth, as no good fruit was produced from them for more than 1000 years after: but arts, like animals to whom great longevity is allowed, have a long infancy and childhood, before adolescence and maturity come on.

PTOLEMY of Lucca, an ecclesiastical historian in the fourteenth century, was descended from a noble family, from whom he derived the name of "Bartholomew Fiadoni." He entered young into the order of St. Dominic, and upon his profession he took the name of Ptolemy. He ranked

among the most celebrated Italian divines of his time, and was the first of his countrymen who employed his pen on ecclesiastical history. He was superior of the monastery at Lucca, and in 1301 and 1302 he filled the same post at Florence. He was afterwards selected by pope John XXII. as his confessor, and in 1318 he was made bishop of Torcello, under the patriarchate of Venice. This prelate died in the year 1327. He was author of "Annales," extending from the year 1060 to 1303, which was published at Lyons in 1619. But his largest work was "Historiæ Ecclesiasticæ," in twenty-four books, commencing with the birth of Jesus Christ, and brought down to the year 1313. This work remained in MS. in the Vatican, Barberini, and other libraries, till it was published at Milan in 1727, by Muratori, in his grand collection, entitled "Rerum Italicarum Scriptores." Moreri.

PTOSIS, from *πτῶσις*, to fall, signifies, in *Surgery*, a disorder of the upper eye-lid, which the patient either cannot elevate at all, or not in a proper degree. In the first case, sight is entirely impeded, unless the eye-lid be raised with the finger; and in the second, although the patient can see a little when he turns his eye downwards, he soon gets into the habit of squinting. The disease also in this state gives him a particularly drowsy appearance. Of ptoſis, surgical authors reckon three species, which originate from three different kinds of causes. The first species proceeds from a preternatural lengthening of the external skin of the eye-lid; the second from weakness, or total paralysis of the levator muscle; and the third from a spasmodic contraction of the orbicularis palpebrarum.

The first is the most frequent case. The preternatural elongation of the skin may be known partly by the appearance of the affected eye-lid, and partly by the circumstance of the patient being able to raise his eye-lid immediately the skin of the part is pinched up into a transverse fold. Sometimes likewise it may be known by adverting to the causes from which the disorder had its origin. Transverse wounds of the lower part of the forehead, or of the eye-lid itself, when their edges are not skilfully brought together, are frequently followed by such an elongation of the skin, the consequent cicatrix being very wide. It often happens, too, that no cause whatsoever can be assigned for this lengthening of the skin. In some instances the complaint is transient and of short duration, as when it depends upon an inflamed or œdematous state of the eye-lids; a case of which we need say nothing more in the present article. Nor need we here dwell upon the example in which the eye-lid is preternaturally distended by an incysted tumour under it, the only indication being that of cutting out the swelling. In the treatment of the first species of ptoſis, the object which the surgeon must have in view is to cut away the superfluous portion of the skin of the eye-lid. A transverse fold of it is to be raised up with the fingers, or a pair of forceps, and removed with scissars. The practitioner must be careful, however, neither to cut away too little nor too much. In the first circumstance, the disease is not effectually cured, but merely lessened; and in the second, an opposite complaint is brought on, namely, a preternatural shortness of the eye-lid. If, while the skin is pinched up into a transverse fold, the patient is capable of raising the eye-lid completely, all is managed rightly, and such fold is to be removed. But if he cannot perfectly raise the eye-lid, a sufficient portion of the skin is not pinched up, and the fold must be larger. Lastly, if he can raise the eye-lid well, but not shut the eye completely, too much of the skin is pinched up, and some of it

must be let loose again. As soon as the requisite quantity of the skin has been cut away, the edges of the wound are to be brought together with adhesive plaster, or a future. The cure is generally accomplished in a few days, and the cicatrix is afterwards scarcely discernible.

Sometimes this species of ptosis may be cured without any operation. In one instance, where the usual operation was about to be performed, and the skin had already been pinched up into a fold, the patient, through fear, suddenly drew back his head, by which means the eye-lid was violently pulled and stretched. This happened three times successively, on which account the operation was deferred. The next day the patient had regained the complete power of moving the eye-lid. (See Janin's Observations sur l'Œil.) The same event has been frequently remarked. Probably, says Richter, the mechanical irritation, and the inflammation thence arising, increased the tone of the levator muscle of the eye-lid, and he takes the opportunity of suggesting that benefit might perhaps be expected (at least in cases in which the eye-lid is not very much lengthened) from cauterizing the eye-lid, or applying to it the tinctura lyttæ, cold water, or a weak solution of the lapis infernalis.

The second species of ptosis, or that proceeding from loss of tone, or paralysis of the muscles of the eye, is more uncommon. It is most frequently met with in old persons, when it is very difficult of cure, if it can be cured at all. Sometimes it precedes apoplexy, or is a remaining effect of that alarming disease. It occasionally proceeds from internal causes, and in this circumstance the treatment comes within the province of the physician, who should endeavour to detect and remove these causes. This second species of ptosis has been known to occur as a symptom of chlorosis. (Müller, Diff. de Palpebrarum affectibus, Halæ 1772.) Sometimes the complaint is caused by irritation in the stomach, in which case a cure may be effected by emetic medicines. In some examples, worms seem to act as a cause; not to mention several other causes of an analogous description. Sometimes the complaint is altogether local, and it is only then that it is to be classed with surgical diseases. Although a patient with this kind of ptosis, can lift up the eye-lid with his finger, he can never do it in any other manner: when the integuments are pinched up into a transverse fold, the levator muscle continues quite incapable of doing its office.

Besides the means already recommended, the following have been resorted to: the shower-bath on the hinder part of the head (Cantwell, in Phil. Trans. N^o 449. p. 33. Guerin, des Maladies des Yeux); the external use of cold water (Warner on the Eye); and, at the same time, the internal exhibition of bark (Alix, Observata Chirurgica, fasc. 2.); a plaster of wax and fetid oil of tartar put on the eye-lid (Chandler on the Eye); a salve of the tinctura mari syriac, honey, and camphor. Lastly, it deserves notice, that this species of ptosis is often periodical.

The third case of ptosis originates from a spasmodic contraction of the orbicularis palpebrarum muscle. It is a most rare form of the complaint, and never lasts. The attack occurs at certain or uncertain periods, and varies in its duration. During the paroxysm one can plainly see that the eye-lids are forcibly closed, and that a great and extraordinary resistance is made whenever an attempt is made to separate them. Such spasm of the eye-lids, says Richter, is always the effect of some idiopathic, or sympathetic irritation. In some instances the affection is confined to the eye-lids; in others it extends to the muscle of

the face, which distorts the countenance in various directions. The sympathetic irritation, which is productive of the spasm, is of different kinds. The complaint often occurs as a symptom of hysteria, hypochondriasis, worms, obstructed menses, &c. and the treatment falls to the duty of the physician. In these examples local means avail little or nothing. The applications recommended, however, are luke-warm milk, in which a small quantity of saffron is mixed; a decoction of white poppy-heads, or of hemlock.

Amongst the local causes which may give rise to this species of ptosis, we have to enumerate such irritating substances as are accidentally introduced under the eye-lid from without. These should be removed, or washed away as soon as possible. Some cases of acute ophthalmia are accompanied with a spasmodic closure of the eye. No cause whatsoever is occasionally assignable for the complaint. In this circumstance, external anodyne applications must be tried, and if they are insufficient, internal medicines of the same class must also be administered. The warm bath, and bathing the eye with warm water, are mentioned as particularly deserving of trial. See Richter's Anfangsgr. der Wundarzneykunst, band ii. kap. 16.

PTYALAGOGA, formed of πτυλλον, *spittle*, and αγω, *I draw*, a word used by physicians to express such medicines as promote a copious discharge of the saliva, such as pellicitory-root, and the like. See SIALAGOGUES.

PTYALISM, PTYALISMUS, Πτυαλισμος, formed from πτυω, *spuo*, *exspuo*, *I spit*, in *Medicine*, a spitting, or a discharge of saliva by the glands of the mouth; whether it amount to an absolute salivation or not. See SALIVATION.

PTYCHIA, in *Ancient Geography*, an island of the Ionian sea, near the isle of Conyra. Some have represented it as a town of this island.

PTYSMA, a word used to express whatever is brought up from the lungs by spitting.

PTYSMAGOGA, medicines which promote a copious discharge by spitting.

PUAGORA, in *Geography*, a town of the island of Sardinia; 15 miles E.N.E. of Sassari.

PUANTE, a river of Canada, which runs into the St. Laurence, N. lat. 46° 24'. W. long. 72° 21'.

PUARAY, a town of New Mexico; 60 miles S. of Santa Fé.

PUBBLE, in *Agriculture*, a term provincially signifying plump or full-bodied, when spoken of grain.

PUBEGA, or PIUBEGA, in *Geography*, a town of Italy, in the department of the Mincio; 14 miles W.N.W. of Mantua.

PUBELA, a town of Bengal; 28 miles S.S.E. of Islamabad.

PUBERTY, in *Physiology*. The Latin word *pubertas* means the growth of the hair about the organs of generation: at the same time that this appears, various important changes occur in the whole economy, which have been included altogether under the term puberty. See GENERATION.

PUBERTY, *Pubertas*, in the *Civil Law*, a natural majority, or the age in which a person is allowed to contract marriage. See MAJORITY.

Boys arrive at puberty at fourteen years of age, maids at twelve. *Full* puberty is accounted at eighteen. See AGE.

Dr. Kramer observes, that all boys at the time of puberty, between twelve and fourteen years of age, complain of uneasiness

uneasiness at their breasts, which are swelled and itchy, the nipples and areolæ round them inflaming with pain, and sometimes excoriation and exulceration of some of the lactiferous ducts. The best remedy for which, he says, is to press out the white serum then contained in them, after which they are cured with a bit of plaster.

By the law of Scotland, persons under puberty, or under the years of discretion, are capable of committing the higher crimes, which being contrary to the law of nature, are obvious. But they are not chargeable with smaller offences arising from positive law or statute.

PUBERTY of *Plants*, the period in which they arrive at their full growth, and are capable of producing blossoms and fruit. It varies very much according to the nature and habits of growth of the particular plants, some arriving early at this state, while others are extremely slow in coming to it.

PUBES, in *Anatomy*, that part of the abdomen adjoining the generative organs, which is more or less covered with hair in both sexes.

PUBESCENCE, **PUBESCENTIA**, in *Botany* and *Vegetable Physiology*, comprehends all the various hairy, downy, or woolly clothing of plants, which Linnæus, under the denomination of *pilus*, a hair, reckons the seventh and last among their *fulera*, or appendages. He defines the *pilus* as an excretory duct, of a tapering or bristle-like form. Such it seems to be in numerous plants, whose hairy coats exude a viscid moisture, like the Garden Clary, *Salvia Sclarea*, and some others of that genus; as well as, possibly, in *Phlomis* and *Verbascum*, some species of which exhale from their dense woolly covering, when slightly touched, a peculiar odour, depending on an exudation, otherwise hardly perceptible; but which can only be conveyed through their pubescence. Such is the soapy odour of *Phlomis fruticosæ*, and the light transient fragrance of various herbs, which vanishes, and is replaced by a different scent, when they are bruised. Odours that reside in glands, or cells, in the surface of the leaf itself, are more durable, if not at first more powerful.—The stinging Nettles, *Urtica*, of which three species are natives of Britain, are unquestionably furnished with a tubular bristly pubescence, each hair of which is pervious, and has at its base a bag of liquid poison, so contrived that when the perforated point of the hair receives a slight touch, the contents of the bag are pressed upwards through the tube, and discharged into any thing, as the human skin, that may be wounded by such minute but formidable weapons. The poison of a viper is conveyed, through its perforated teeth, in the same manner. When that animal is not excited to attack or vengeance, its fangs are recumbent and harmless. So when the pubescence of a nettle is forcibly depressed, by a rude or fearless grasp, these delicate points cannot insinuate themselves so as to take effect.

The hair or pubescence of plants, though generally tubular, is not always pervious, being very frequently found, with the assistance of a slight magnifier, to consist of numerous joints, distinguished by transverse partitions. Fluids cannot readily be supposed to pass along a tubular body beset with such impediments. Yet, if we mistake not, such a jointed structure exists in the pubescence of several glutinous plants.

The external configuration of the pubescence of vegetables is very different in different species and tribes. The hairs are sometimes hooked, as on the calyx of *Myosotis*, and the herbage of some Syngenesious plants. In the genus *Hedypnois* of Fl. Brit. now adopted in Willdenow

and other writers by the name of *Apargia*, the hairs of the leaves and other parts vary in having one, or occasionally more, forked terminations. In *Croton*, *Solanum*, and *Lavatera*, they often assume an elegant starry figure, being in the last mentioned genus, and several of its allies, densely entangled, and occasionally endowed with a stinging or pungent, if not venomous, quality. The pubescence of *Hippophaë*, and some species of *Croton*, is partly starry, but on the whole so depressed as to become scaly, nor does it seem capable of conveying any fluid through its own substance.

The pubescence of some plants is exquisitely delicate, whether it consists of erect or depressed hairs. Of the former kind the *Pelargonium odoratissimum*, *Geranium rotundifolium*, and *Althæa officinalis*, are instances, infinitely transcending the pile of the finest velvet, in softness and minuteness. Of depressed pubescence, no more beautiful example can be found than in the White Willow, the Silver Tree of the Cape, *Protea argentea*, or the Silver-leaved Ladies' Mantle, *Alchemilla alpina*. A more dense, woolly, and impenetrable covering attracts our notice in various oriental plants, natives of the arid and scorching soil of the Archipelago. These seem to require such a protection against a burning sun, by which all their moisture might otherwise be dried up. It is far more difficult to account for the abundance of such a woolly coating, on the under sides of the leaves in so many Mexican plants, whose smooth upper surfaces are exposed to the hot sun of that climate. Possibly, after all, some chemical operations may be performed in the wool itself, where the necessary agents of moisture, air, and exhaled effluvia, are present, as well as the greatest possible quantity of light that the position of the leaves will admit of, the wool being always white, and its substance pellucid.

Whatever other purposes the pubescence of plants may answer, its mechanical use, in abundance of instances, cannot be overlooked. We can be at no loss to understand how the appropriate covering of each particular species, or of the several parts of any one herb, may be effectual in repelling or moderating the attacks, or the accidental injuries, of insects, or the atmosphere. It is one, amongst many, means, by which rain, in quantity, is studiously prevented from lodging on the foliage of plants, for any length of time. Leaves require a more continual intercourse with air, and even with light, than with wet; by which last, if superabundant, their predominant functions are impeded, and their constitution finally injured; except their nature be such that, like fishes, they cannot exist out of the water.

The envenomed armour of the Stinging Nettles seems so powerful a defence against the attacks of caterpillars, that it is difficult to conceive how any of them can trust their delicate skins within its reach. Yet nothing is more certain than that the plants in question afford nourishment to a greater variety of such insects than most others. Possibly the copious prominent bristles, or tufts of hairs, with which many of them are covered, being longer than the pubescence of the nettle, may sufficiently protect them, and enable them to range with impunity over the leaves, on which they feed.

Few appendages to the herbage of plants are more variable than their pubescence, at least with respect to quantity, and even structure. Young shoots and leaves are often very downy or hairy, though subsequently they become quite smooth. The purpose of protection against heat and cold, or too much wet, is well answered by such a clothing in their first tender state, and at an unfavourable or unsettled season. It either drops off, or becomes more scattered, by the expansion of their surface. Circumstances, with which

we are but little acquainted, act in some way or other on the constitution of many plants, so as greatly to influence the quantity of their pubescence. Thus we have seen several mints, hairy or smooth in their native situations, becoming very much if not entirely the reverse, the next season, on being transplanted into a garden. Nor does this change always appear to depend on any sudden transition with regard to moisture. In general, however, it is found, that bog or aquatic herbs, become more hairy on removal into a dry soil or situation; and also that a change from shade and moisture, to an open, airy, or sunny exposure, produces the same effect. The rich dense woolly, cottony, or silky clothing, of many rock or alpine plants, becomes starved, mean, and unsightly, in our gardens, as their whole form and constitution assume an enfeebled laxity or meagreness. Even in a state of nature, as we have remarked above, the hairs of the same species are occasionally simple or variously forked. The hooks or curvatures of such appendages are usually more permanent in every case; but always most decided or vigorous in proportion as the plant is most healthy.

The direction of the hairs or bristles, composing the pubescence of plants, proves, on a careful examination, to be more invariable than any circumstance attending such appendages. This was first remarked by the writer of the present article, in the progress of his investigation of the British *Mentha*. The direction of the pubescence, as well indeed as its absence or presence, on the calyx and flower-stalks of these plants, is found to indicate more certain specific distinctions than any other. By attending to its position, their innumerable and ever fluctuating varieties are reducible to a determinate number of certain and well-defined species. Dr. Roth, an able German botanist, has since applied the same test to the genus of *Myosotis*; in which, on the contrary, several species, readily distinguishable by the pubescence of their calyx, had been huddled together as varieties. (See MENTHA and MYOSOTIS.) In *Galium* the direction of the minute prickles on their leaves, or on the different parts of their leaves, stands us in equal stead, for the determination of some otherwise obscure and difficult species. It would be well if botanists would pursue these observations, and by that means perhaps elucidate the specific characters of other disputed or intricate plants. We have derived some benefit from this principle in *Salix*, but we lament its insufficiency, not its failure, in the more perplexing family of *Saxifraga*. In *Ranunculus* it confirms rather than leads the character. In the class *Tetradynamia* it solves some difficulties, but does not serve us throughout. There is, however, no instance, that has fallen under our observation, of any variation in the direction of the pubescence of any plants, in the same species, that could cause the least perplexity, where it serves at all to distinguish one species from another.

PUBIS Os, in *Anatomy*, the anterior part of the os innominatum. See EXTREMITIES.

PUBIS *Symphysis*, the union of the right and left ossa pubis, by which the pelvis is completed in front. See EXTREMITIES.

PUBLIC ACCOUNTS. Commissioners are to enquire of the accounts of sheriffs, customs, and other the king's officers, after having been passed in the exchequer, and if detected of any fraud they shall pay treble damages, by stat. 6 Hen. IV. cap. 3. And all the lands, tenements, and hereditaments, which any accountant hath, shall for the payment of debts to the crown, be liable and put in execution in like manner as if he had stood bound by writing obligatory, having the effect of a statute staple, &c. stat. 13 Eliz. cap. 4; and there have been several statutes for tak-

ing the public accounts of the kingdom, and examining and determining the debts due to the army and navy; also corruptions in the management of the king's treasure, &c. empowering commissioners for that purpose, who were to give an account of their proceedings to the king and parliament, stat. 2 W. & M. 1 Ann. 2 Geo. I. &c. See PUBLIC ACCOUNTS.

PUBLIC Acts. See ACTS, and STATUTE.

PUBLIC Buildings. See BUILDING.

PUBLIC Notary. See NOTARY Public.

PUBLIC Path, a common path through a field or other place. See PATH.

PUBLIC Road. See ROAD.

PUBLIC Speaking. See PUBLIC SPEAKING.

PUBLIC Verdict. See VERDICT.

PUBLICAN, PUBLICANUS, among the Romans, a person who farmed the imposts, taxes, and public revenues.

This function was usually exercised by the Roman knights, who constituted an order of great consideration at Rome, and a kind of middle rank between the senators and the people. Their institution was as early as Romulus. They did not attain the great offices, nor enter the senate, as long as they continued in the order of knights; and thus they were the more capable of employing themselves in collecting the revenues of the Roman people.

The publicans are distinguished by Sigonius into three sorts or degrees: the farmers of the revenues, their partners, and their securities; in which he follows Polybius. These are called the Mancipes, Socii, and Prædes, who were all under the Quæstores Ærarii, that presided over the finances at Rome. But there were properly only two sorts of publicans, the Mancipes and the Socii. The former, called by the Greeks ἀρχιμελωναι, were much superior to the common publicans in dignity, being mostly of the equestrian order; so they were generally in their moral character. Cicero mentions them with great respect and honour: "flos," says he, "equitum Romanorum, ornamentum civitatis, firmamentum reipublicæ, publicanorum ordine continetur." Orat. pro Plancio, apud Opera, vol. v. sect. 9. p. 544. Olivet edit. He likewise calls them "ordinem mihi commendatissimum." Epist. Fam. lib. xiii. epist. 10. Oper. vol. vii. p. 442. epist. 9, and epist. ad Attic. lib. i. ep. 17. vol. viii. p. 80.

But as for the common publicans, the collectors or receivers, as many of the Socii were, they are spoken of with great contempt, by Heathens as well as Jews; and particularly by Theocritus, who said, that among the beasts of the wilderness, bears and lions are the most cruel; among the beasts of the city, the publican and parasite.

The reason of this general hatred was, without doubt, their rapine and extortion: for having a share in the farm of the tribute, at a certain rate, they were apt to oppress the people with illegal exactions, to raise as large a fortune as they could for themselves. Besides, publicans were particularly odious to the Jews, who looked upon them to be the instruments of their subjection to the Roman emperors; to which they generally held it sinful for them to submit. So that paying tribute to the Roman emperor they looked upon to be a virtual acknowledgment of his sovereignty. This was, therefore, a peculiar grievance, and created an aversion to the collectors, as the instruments of illegal oppression, apart from all consideration of their rapacious practices. Moreover, the Jews, who accepted the office of publicans, were on that account hated of their own nation equally with heathens: and according to the rabbies it was a maxim; a religious

religious man, who becomes a publican, is to be driven out of the society of religion.

Nevertheless, some of the publicans in Judea were honest persons, and respected on account of both their character and substance. Such a one was Levi or Matthew. (See Luke, v. 29. Matt. ix. 10. Mark, ii. 14.) No hint occurs of any unjust practices which Levi had been guilty of, in the post which he had occupied; and from the great openness and impartiality with which the evangelists have written their history, it is reasonable to conclude, there was no exception against Matthew's character, besides his employment, which undoubtedly was not reputable. Publicans, who were Jews, are so often mentioned in the gospels, that Dr. Lardner seems almost inclined to think that the Roman tribute was collected for the most part by Jews. The Romans might make choice of this method. The Jews that were thus employed became odious, but the Roman government was relieved. In most provinces our author conceives that natives were employed in the towns as under-collectors, and that the receivers-general, or other superior officers, were only Romans. The publicans were far from being beloved in any province; the Romans might, therefore, judge it prudent to employ some natives in collecting taxes; and it is probable, that in all places some would be found, who were willing to make an advantage of the subjection of their country, and accept places under the Romans their masters.

PUBLICANS was also a name given to the Arnoldists and Albigenfes.

PUBLICANDIS, *Regula de*. See RULE.

PUBLICATION, PUBLICATIO, the act of promulgating, or making a thing known to the world.

By the canons, publication is to be made of the banns of marriage three times before the ceremony can be solemnized; without especial licence to the contrary. See MARRIAGE.

PUBLICATION, in *Law*, is used of depositions of witnesses in a cause in chancery, in order to the hearing; and rules may be given to pass publication, which is a power to shew the depositions openly, and to give out copies of them, &c. The cause is then ripe to be set down for hearing, which may be done at the procurement of the plaintiff, or defendant, before either the chancellor or the master of the rolls, according to the discretion of the clerk in court, regulated by the nature and importance of the suit, and the arrear of causes depending before each of them respectively.

There is also a publication of a will, which is a solemnity requisite to the making thereof, by declaring it to be the last will of the testator, in the presence of a number of witnesses; and a will, which hath been made many years, may be new published, with additions, and that makes it equivalent to a new will. 3 Nels. Abr. 27.

PUBLICATION of *Libels*. See LIBEL.

PUBLIUS, SYRUS, in *Biography*, a celebrated composer of the dramatic pieces called *Mimes*, was a native of Syria, and was brought, while young, in the condition of a slave, to the Roman capital. He had the happiness to fall into good hands, and his master afforded him an excellent education, and then liberated him. He became distinguished in the time of Julius Cæsar; and after the death of Laberius, succeeded him with still greater applause on the mimetic theatre. His writings, of which fragments only remain, were held in high estimation by Julius Cæsar, Cassius Severus, and Seneca. These fragments have been published, with those of Laberius, and other writers, illustrated by the notes of various critics. The best edition is said to be that of Havercamp and Preyger, 1708.

PUBNA, in *Geography*, a town of Bengal, in the circar of Bettooriah; 28 miles S.S.E. of Nattore. N. lat. 24° 2'. E. long. 89° 23'.

PUC, a lake of Mexico, in the south part of the province of Yucatan; 30 miles in length, and 10 in its greatest breadth; communicating by a river with the bay of Honduras.

PUCARA, a town of Peru, in the diocese of La Plata; 65 miles W. of Caravaya.

PUCCA, in *Commerce*. See MAUND.

PUCASERAI, in *Geography*, a town of Bengal; 25 miles E.S.E. of Biffumpour.

PUCCOON, in *Botany*. See SANGUINARIA.

PUCULOE, in *Geography*, a town of Bengal, capital of the circar of Attyah; 94 miles E. of Moorshedabad. N. lat. 24° 10'. E. long. 90° 7'.

PUCELAGE, in *Natural History*, a name by which some authors among the French have called the porcelain-shells.

PUCELLAGE, PUCELLAGIUM, in an ancient manuscript written *puellagium*, denotes the state of virginity, or maidenhead.

PUCERON, the name given by naturalists to a small insect of a peculiar nature, frequently found on the young branches of trees and plants, often in such clusters as wholly to cover them.

The puceron is a small animal, but very numerous in the several genera and species; inasmuch that Reaumur has observed that there is scarcely a vegetable to be found, either in the fields or gardens, that has not its peculiar species of puceron to feed on its juices. M. de la Hire, of the Paris Academy, has left many curious particulars in regard to these animals, in the Memoirs of the year 1703; and M. Leeuwenhoeck, and others since, have given figures and descriptions of several of the species.

Pucerons are all viviparous animals, and that after a very singular manner. It is to be observed, that the name is scarcely more expressive of the creature, than some of the others given of late to insects; that of the polype to a creature which has no legs or feet at all, is very improper; as that of the puceron hardly less so, as it would naturally lead us to imagine, that the creature thus called was able to hop like a flea, whereas, in reality, it is very slow in its motion, and seldom so much as walks.

These creatures have six legs, which are extremely small and slender; and which, when the animal is at its full growth, are loaded with a weight so large, that they seem scarcely able to support it. Some of the species arrive at a tolerable bigness from common observation; but the greater number are too small to be accurately seen without the assistance of glasses. Among these insects there are great numbers that in their full perfection have wings, and become a sort of little flies: these are distinguished from the others by the name of *alated* pucerons.

Those species which never become winged, have nothing of the appearance of the caterpillar kind; having not long but short bodies, and much resembling flies whose wings had been taken off. All the species have antennæ or horns; but these in the several kinds are very different from one another, some being very short, and others as remarkably long; and of these last kinds, some carry them straight before the head, as is the usual custom, and others carry them laid along over their backs; in some of these the horns are longer than the body. But beside these antennæ, the greater number of these creatures have two other horns or spines placed in a very singular manner behind them near the tail. They are placed at some distance at their origin, but they

PUCERON.

they become more distant as they go out from the body. These are much thicker and much shorter than the antennæ; and there are among the various kinds of them, some which actually want them, and others which appear to want them, though they have them in reality; and others have in the places of them certain round spots, which stand just where they should, and seem destined to perform their functions.

The several kinds of pucerons differ greatly in colour. The greater number of them are green; but many are brown, some yellow, and some are black. In August the rose-trees afford a vast number of them of a pale red, and some exactly of the colour of the damask rose; in some other months of the year we find green ones on the rose-trees. The sycamore and several other plants afford green ones in the summer, and red ones in November; and there seems no doubt, but that these are the same individual animals which change colour, the leaves and juices of the plants being not capable of affording them the same sort of nourishment at some times that they do at others. Some of them also are of a dusky colour, and others bright and shining, as if varnished over. Those of the willow, of the poppy, and some other plants, are of a cloth-like appearance, and some resemble velvet; others, as those of the apricot, and of the catch-fly, are shining, as if covered with the finest lacquer. Some appear of the colour of bronze metal, when it has its highest polish; such are those of the tanfy, and some other plants. The largest kind are found on the oak and other trees. The gooseberry-bush affords a species that are of the colour of mother-of-pearl; and, in general, the skin or covering of those species which are thus bright and shining, is much harder and firmer than that of the others. The more usual species are all over of one colour, but there are some others which are spotted; that of the common wormwood is prettily speckled with black and brown; those of the sorrel are green in the middle, and black at each extremity; and there are several others, as of the willow, &c. that are variegated with these two colours.

It is not certain, however, that all the species are peculiar to the plants upon which they are found; for it has been observed, that when a plant of the common wormwood has been full of them, by some accident they all have left it to fix themselves upon plants in the neighbourhood, which had juices of a less disagreeable taste. These creatures always live in companies; we never find them singly on plants; and very seldom otherwise than in extremely great numbers. In plants they fasten themselves on every part; but in trees they only seize upon the leaves and young shoots, and they usually cover these entirely, leaving no part to be seen.

The elder is the tree on which they are of all others the most plentifully produced, and on which they are observed in their several stages with the greatest accuracy and ease. They often cover the thick green roots of this tree for many inches together, and sometimes for many feet; and they are always placed so close together, that they touch in every part, and sometimes they lie in two beds, one over another. These are of a greenish-black. If they are observed on the branches undisturbed, they are always found to be perfectly quiet, and seem to pass their whole lives in inaction; but they are all this time doing the most necessary business of life, that is, sucking in their own nourishment from the juices of the tree. They do this by means of a fine slender trunk, which easily escapes the naked eye; but it is always found by the microscope, and it is by means of this that they pierce the bark of the tender parts of the vegetables, and get at their juices. The trunk is usually of two-thirds

of the length of the body; but when they are moving on, it is always applied so closely under the belly, that it is not seen.

When there are two series of these insects placed one over another, they are always more loosely placed in the upper series, and these are usually the larger, and the nimbler in all their motions. In this case they have no power of sucking the plant; for beside that it is close covered with the other series, their trunks are not long enough to reach and penetrate it from the height at which they stand above it. These, therefore, are such as have no farther need of nourishment, but are employed in propagating their species.

M. Reaumur saw them brought forth; and indeed Mr. Leeuwenhoek long before saw, by the help of microscopes, the young animals perfectly formed, though extremely minute, in the bodies of the full-grown females.

They are a sort of animal which propagates so quickly, that usually there are many females on the same leaf or branch of a plant in labour at the same time; and their fecundity is so great, that when they have once begun to bring forth young ones, they seem to continue it incessantly for a long time together. They will often bring forth fifteen or twenty successively, and if their bodies be a little squeezed afterwards, there are forced out of them a vast number of others less mature.

These little insects are extremely plentiful on many different trees, and are very easily observed in their several stages and progressions by a curious searcher after them; but if at any time they are not so easily found, the person who seeks after them may be conducted to them by the ants, which he will find moving in great numbers on the trees and plants where they are, and pointing out the way to them.

M. Leeuwenhoek, Hartsoeker, and others, have observed this, and have supposed that the ants fed on them, by their frequenting the places where they are found; but that is far from being the case, the ants, on the contrary, seem to love them as friends. We may easily find out the reason of the ants following the clusters of pucerons, without doing them any injury, when we consider that the ants love sugar and all sweet things, and the places about which the pucerons are, have usually the cavities filled with a thick saccharine matter, and this the ants feed upon.

The most natural opinion would seem, that this was the juice of the tree simply extravasated; but experience shews that it has another origin: it is really the excrement of these pucerons; they receive no solid food into their bodies, all that is conveyed into them coming through their trunk, which is an extremely fine pipe; and as none but a very thin and pure juice can be received through such an organ, it is no wonder that the creature, which lives wholly upon it, should void no solid excrements. The drops of this liquor are not so frequently found on the leaves of plants as might be expected, and that because many of them are immediately devoured by the ants, and many others are dried up by the sun; but they may always be found collected in some quantity in the bladders of the elm, and other trees inhabited by these creatures, as there the liquor is defended from the heat of the sun, and is safe from being devoured.

The puceron, like most other insects, changes its skin three or four times before it arrives at its full growth. These exuviae perfectly resemble the animal in its natural state, the legs and other parts being all in their proper places; but whatever is the colour of the species of puceron, these skins which it casts are whitish.

The male and female pucerons, as they are usually supposed

posed to be, differ greatly from one another in form, even in their time of growing, but much more eminently at the time of their maturity, the male having then wings, which the females never have. Læwenhoek and others, who have treated of these animals, have supposed that they all became at length little flies, that is, were winged; but this is a great error.

Notwithstanding, however, the general opinion, that the winged pucerons are all males, and the unwinged ones females, it appears that their manner of generation is yet unknown to us. This opinion was formed too hastily by some from a supposed analogy of these and other insects; but later observations prove that this is not strictly the case: for that the winged ones, as well as the others, bring forth young ones. Some have supposed, that these winged and naked pucerons were the offspring of different families of several species living together; but the contrary is proved by this, that the winged ones are found to produce some winged and some naked ones; and the naked to produce both kinds in the same manner. Some have imagined, that they found the male pucerons among the others, observing some of a flatter shape, in whose bodies there were never found any young ones, as there always were in the others, even when they were very young; but these have been since found to be only such females as had already brought forth their offspring.

The young pucerons being themselves filled with embryos, and that in every individual, so that all that have been ever examined appear mothers, has given many strange ideas of the manner of their generation: many have imagined them all to be hermaphrodites: and as no copulation has ever been observed among them, they are by some supposed to be able to impregnate each itself. The later opinion, however, is, that when a female is once impregnated by a male, she will bring forth young ones already impregnated with others, and thus to the third or fourth succession; so that copulation is only necessary to these animals once in three or four generations, and the children and children's children of an old puceron that has had congress with a male, will bring forth young ones without having ever had any such congress. Reaumur's Hist. Inf. vol. vi. p. 9, &c. See *WOOD-Puceron*, *OAK-Puceron*, &c.

PUCERON, Bladder, a sort of puceron that lives in bladders on the leaves of trees. See *PUCERON*, *supra*.

We often observe on the leaves of different trees, a sort of roundish bladders, which only adhere to the leaf by a short pedicle: these are a sort of small galls, and their figure varies much in the different kinds; some are less round than others, and many are very rough on the surface, and sometimes they are long, terminating in a point, and being broader at the base than in any other part, and sustained by no pedicle, but fixed immediately to the leaves.

The elm and ash affords us more frequent instances of these than any other trees, and very often on the first of these they grow to the bigness of a nut, and sometimes much larger; and when they are grown to their full size, they often take up the whole surface of the leaf. When these bladders are opened, they are found to contain a large number of pucerons.

If these bladders are examined at the time when they are but newly risen, which usually is the beginning of June, on opening them there is usually found in them only one puceron, and that always a female big with young; and in others more advanced, the parent insect is found surrounded with different numbers of her young ones. These bladders have all of them at first only one female puceron; but after-

wards they have more, as they become larger; and the largest of all are usually found filled with a prodigious number of young ones. The newly risen bladders are always found close and firm in every part; the aperture, at which the female puceron had entered, being usually neatly and closely stopped up. The question is, how this bladder was formed?

The method of the formation of them seems to be this: as soon as the female puceron is produced, she fixes her trunk into the leaf to suck its juices; the consequence of this in all the pucerons is, that the surface of the leaf separates a little from the nervous part. In the common cases, the creature takes no advantage of this, but only continues sucking the juices; but in this kind, the female, as soon as she has made the separation between the parts of the leaf, gets into the cavity that is formed there, by enlarging the orifice first made by the trunk, till it will admit her body. When once in, she works forward in a straight line, and the hole behind her soon closes up, as there was no rupture, but only a stretching open of the parts of the leaf. The female thus finds herself in a secure place, and the elevation she makes in the leaf is scarcely perceivable, only appearing as an oblong small species of gall. The mark of the aperture, at which she made her way in, is always to be seen at some distance behind her, though usually very neatly closed up: thus the whole continues till the creature produces her young. But then the scene is quite altered; the young ones begin to suck as soon as produced, and as they usually seize upon the sides of the small gall, already formed for that purpose, this derives more juices than otherwise would flow into it; and it begins to elevate itself much higher, and forms a tubercle of the shape of a nut or pear.

Its growth, in this case, is entirely analogous to that of the common galls on the branches of trees, &c. and all the difference in the shape of the several bladders is owing to the manner of the young puceron sucking; for if they suck much at its base, that enlarges and becomes the broadest part, as is the case in the conic and pointed ones; but if they let this alone, and suck only the sides and upper part, they swell while this does not, and consequently this forms a sort of pedicle to the growing bladder.

PUCERON, Bassard. See *FIG-Infest*, and *GRUB of the Box*.

PUCERON, Earth. See *EARTH*.

PUCERON, Grub. See *GRUB*.

PUCERON-Eater, or *Lion-Puceron*. See *LION-Puceron*.

PUCERON, Oak. See *OAK*.

PUCERON, Ver. See *VER Puceron*.

PUCERON, Wood. See *WOOD*.

PUCHATUI, in *Geography*, a town of Russia, near the sea which separates the continent of Asia from America. N. lat. 65° 50'. E. long. 188° 34'.

PUCHELBACH, a town of Tyrol; 8 miles S.E. of Reuten.

PUCHENSTAIN, a town of the duchy of Stiria; 6 miles N. of Windisch Gratz.

PUCHINGONG, a town of Bengal; 48 miles S.E. of Dacca.

PUCHLACHTA, a town of Russia, in the government of Archangel, near the White sea; 56 miles N.N.W. of Oneg.

PUCKARPOUR, a town of Hindoostan, in Oude; 8 miles S. of Bahraitch.

PUCKARYA, a town of Bengal; 23 miles N. of Goragot.

PUCKASTER COVE, a creek or bay in the English Channel,

Channel, on the south coast of the Isle of Wignt, a little east of Rocken End.

PUCKAUN BEADY, in *Natural History*, a name given by the people of the East Indies to a peculiar species of opiment, which they use in medicine.

They find it on the hills and on the banks of rivers. It is prepared by several tedious processes, and then is given with success in a diabetes.

PUCKBALL, a common name of a species of mushroom, full of dust.

PUCKER, in *Geography*, a river of Hindoostan, one of the arms of the Indus, which runs into the sea.

PUCKHOLI, a town of Asia, and capital of a district, in the country of Lahore, situated at a considerable distance on the east of the Indus; and therefore it cannot occupy the site of the "Peucelaotis" of Alexander, since that lay on the west bank of the Indus: but as Alexander advanced to this place, from the neighbouring district of Bazira, and the country of the Affacani, (*i. e.* Bijore and Ashenagur, which was the name of Sewad only a few centuries ago,) major Rennell very much suspects that Peucelaotis was the ancient name of Puckholi, and that an alteration of boundary, which has frequently taken place in other provinces, may have confined its limits to the east side of the Indus, in the present times; although it might anciently have extended further to the west. The district called Puckholi, Sewad (or Sowhad), and Bijore, were the scene of Alexander's warfare on the west of the Indus; all of which were subjected to regular authority, during the long and vigorous reign of Acbar. Rennell supposes Puckholi to have been the "Pactya" of Herodotus, (as well as the "Peucelaotis" of Arrian,) from whence Scylax set out to explore the course of the Indus, under the orders of Darius Hystaspes; for it lies towards the upper part of the navigable course of that river, being the frontier province of Hindoostan, east of the Indus. The Ayin Acbaree gives its dimensions at 35 cosses by 25; and says, that it is bounded on the south by the districts of Attock. Its eastern limit is the river Kishengonga; and the Indus takes its general course between the provinces of Puckholi and Sewad. Few particulars are known concerning it, except that the northern, and by far the greater part of it, is mountainous. Puckholi, its capital, is 85 miles S.W. of Cashmere. N. lat. $33^{\circ} 45'$. E. long $72^{\circ} 5'$.

PUCKLE-NEEDLE, in *Agriculture*, the common name of a troublesome weed in hard tilled lands, among the wheat, injuring the sample in a high degree. It is with difficulty separated from the grain. It is often known by the names of shepherd's needle and beggar's needle. See WEED.

PUCKO, in *Geography*. See PAUSK.

PUDAGERI. See PONDICHERRY.

PUDAGUL, a town of South America, in Chili; 16 miles W. of St. Yago de la Nouvelle Estremadura.

PUDAMPOUR, a town of Bengal; 37 miles W.N.W. of Rangur.

PUDASJARVI, a town of Sweden, in the government of Ulea; 44 miles N.E. of Ulea.

PUDDAMBALLY, a town of Hindoostan, in the province of Cattaek; 35 miles W.S.W. of Cattaek.

PUDDAMPOUR, a town of Hindoostan, in the province of Cattaek; 8 miles E. of Cattaek.

PUDDAMTOLA, a town of Hindoostan, in Orissa; 35 miles S.E. of Boad.

PUDDANGARDE, a town of Hindoostan, on the coast of Malabar; 10 miles N. of Paniany.

PUDDAR, or PADDAR, a river of Hindoostan, which rises in the country of Agimere, and discharges itself

through several openings into the gulf of Cutch, 30 miles S.W. of Janagur. Some have supposed that the word "Puddar" may be merely an appellative, and that the proper name of the river is Butlefs. This river periodically overflows a tract of low fenny land, on the west of Amedabad.

PUDDENING, in a *Ship*, a thick wreath or circle of cordage, tapering from the middle towards the end, and fastened about the main-mast and fore-mast of a ship, to prevent their yards from falling down, when the ropes by which they are usually suspended are shot away in battle. The puddening is generally formed in the following manner: a small piece of rope, whose length is twice the diameter of the mast, is spliced together at the two ends; and being thus doubled and extended, a thimble is seized into each of the extremities. After this a large quantity of parcelling is firmly wound about its surface, in such a manner as to make it gradually larger from the two ends towards the middle. It is afterwards once or twice sewed with spun-yarn throughout the whole length, to bind the parcelling more closely, and render it more compact; and the whole is completed by pointing it on the surface. Being then fitted with the laniard at one of the eyes, it is fixed about the mast by passing the laniard alternately through both eyes or thimbles on the fore side of the mast. Falconer. See DOLPHIN.

Puddenings are also ropes nailed to the arms of the main and fore-yards near the ends, and then three or four at due distances inwards one from another, in order to keep the robbins from galling or wearing asunder upon the yards, when the top-sail sheets are haled home.

They call also those ropes which are wound about the rings of anchors, to save the clinch of the table from being galled with the iron, by this name; so that when the ring is so served, it is called the *puddening of the anchor*.

PUDDING-FISH, in *Ichthyology*. See SPARUS *Radiatus*.

PUDDING-Grass, in *Botany*. See MENTHA *Pulegium*.

PUDDING-Pipe-Tree, the English name of a genus of plants, called by botanical writers *caffia*.

PUDDING-Stone, in *Mineralogy*, a term applied by English lapidaries to an aggregate of oblong and rounded pebbles of flint, about the size of almonds, and usually black, imbedded in a hard siliceous cement, of a light yellowish-brown. This mineral substance is capable of receiving a very high degree of polish, and was formerly much used in inlaying, and other ornamental works. It is chiefly procured from the county of Essex. See OCULATUS *Lapis*.

PUDDLE, a small hollow full of water, especially of that which is of the more dirty kind, as in roads or fields.

PUDDLE also denotes loamy earth mixed up with water, to the consistence of thin mortar, for securing the bottom and sides of a canal or reservoir from leaking.

PUDDLE-Gutter, or *Puddle-Ditch*, is a ditch filled up with puddle, so as to form a wall of that substance within any bank that is to retain a head of water; as *aefb*, *Plate I. Canals*, *fig. 14*.

PUDDLING-BOOTS are strong leathern boots, provided for the men who perform the operation of puddling.

PUDDOCK, in *Agriculture*, a term used to signify a small inclosure. See PADDOCK.

PUDDY, in *Commerce*, a measure of capacity at Madras. The puddy by which oil, milk, and some other liquids are sold, is the same as that used for grain; and therefore 77 such puddies are = 125 quarts.

PUDENDA, in *Anatomy*, the external organs of genera-

tion in both sexes. The singular word pudendum is often applied to the female.

PUDENDAL ARTERY, a branch of the internal iliac distributed principally to the organs of generation. See **ARTERY**.

PUDENDUM denotes a thing to be ashamed of. Hence, *pudendum virile*, and *pudendum muliebra*. See **GENITAL**.

It is remarkable, that among the fish-tribe, all that are oviparous have no pudenda, properly speaking; that is, they have no penis or vulva, unless the ovaria of the females, and the vesiculæ feminales of the males, may be called by that name.

The viviparous fish, on the other hand, as the cetaceous fish in particular, and many kinds of the cartilaginous, have the penis and vulva, distinctly and properly so called. *Arctedi Ichthyolog.*

PUDENDUM Regale. See **APHRODITA**.

PUDGDARGONG, in *Geography*, a town of Hindoostan, in Goondwana; 38 miles N. of Nangpour.

PUDGLA, a town of Anterior Pomerania, and island of Ufedom, the principal place of a bailiwick; 6 miles N.E. of Ufedom.

PUDIANO, in *Ichthyology*, called also *pediano*, and by others *vermelho*, *apaimixira*, and *tetimixira*, a fish of the size of a middling perch, but not so broad as that fish. Its whole body is of a gold yellow; but that the upper part of its head, and its back, to the end of the back-fin, are of a very beautiful purple; the rim or edge of the belly-fin is also purple, and the rest of a gold yellow. It is a wholesome and well-tasted fish.

PUDIANO Verde, the name of an American fish of a very remarkable colour, and very well-tasted and wholesome.

It is of an oblong shape, and its usual size is about ten fingers long, and three broad in the broadest part; for towards the tail it is but about half that breadth.

PUDICA INTERNA, in *Anatomy*, the same as the pudendal artery. The pudicæ externæ arteries come from the femoral.

PUDICA Planta, in *Botany*. See **MIMOSA**.

PUDICOTTA, in *Geography*, a town of Hindoostan, in Coimbatore; 12 miles N.W. of Caroor.—Also, a town of Hindoostan, in Marawar; 10 miles N.N.E. of Trumian.

PUDIMO, a small island on the east side of the gulf of Bothnia. N. lat. $63^{\circ} 18'$. E. long. $21^{\circ} 42'$.

PUDMAH, a town of Bengal; 20 miles N.N.E. of Palamow.

PUDMOUL, a town of Hindoostan, in Bahar; 18 miles N.N.E. of Hajipour.

PUDOGA, a town of Russia, in the government of Olonetz, on the east coast of the lake Onezskoe; 108 miles E. of Olonetz. N. lat. $61^{\circ} 36'$. E. long. $36^{\circ} 30'$.

PUDOL, a town of Russia, in the province of Usting; 124 miles N. of Usting.

PUDSER, a town of Bengal; 13 miles N. of Natore.

PUDSEY, a large township and chapelry, in the parish of Calverley, and wapentake of Morley, west riding of Yorkshire, is situated at the distance of 4 miles E. from the town of Bradford, and 197 N. from London. This township consists of Middle, Nether, and Over Pudsey, which together contain, according to the population returns of 1811, 997 houses and 4697 inhabitants. It is indebted for its origin to a society of Moravians, chiefly emigrants from Germany, who settled here in 1748; and for its progressive improvement to the increase of its manufactures. The Mo-

ravians have here a chapel, refectory, dormitory, school, and chair-houses, upon the plans generally adopted by that very peculiar, but sober and industrious, sect of Christians.

PUEBLO, a town of Spain, in Galicia, near the Atlantic; 25 miles S.S.W. of Santiago. N. lat. $42^{\circ} 32'$. W. long. $8^{\circ} 51'$.—Also, a town of Spain, in the province of Grenada; 5 miles N.N.E. of Huesca.—Also, a town of Spain, in Aragon; 16 miles S. of Saragossa.

PUEBLO d'Alcocer, a town of Spain, in Estremadura; 39 miles E. of Merida.

PUEBLO de los Angelos, a town of Mexico, and capital of the province of Tlascala. The buildings, generally of stone, are lofty and elegant; the streets are broad, clean, and regular, intersecting one another at right angles: in the centre of the city is a large square, said to be equal, if not superior, to that of Mexico. On three sides it is adorned with uniform porticoes, occupied by shops full of all kinds of rich commodities; and on the other side is the grand cathedral, with a beautiful front and two lofty towers, all of stone, in the modern taste. It is now the see of a bishop, translated hither from Tlascala. It has several churches, besides the cathedral, and also convents, well built and richly adorned: the best felts in the country are made in this city, besides which it has also a mint and a glass-house. The number of houses is estimated at sixteen or seventeen hundred. A small river runs through the town, and the adjacent valley produces vines, and all sorts of European fruits. In its vicinity are several sorts of mineral waters; 7 miles E.S.E. of Mexico. N. lat. $29^{\circ} 35'$. W. long. $99^{\circ} 40'$.

PUEBLO Cordova, a town of South America, in the province of St. Martha, on the coast of the Spanish Main; 20 miles S. of St. Martha.

PUEBLO de los Infantes, La, a town of Spain, in the province of Seville; 13 miles N. of Carmona.

PUEBLO Moro, a town of South America, in the province of Chocos; 20 miles E.S.E. of Zittara.

PUEBLO Nuevo, a town of Mexico, in the province of Veragua, near the Pacific ocean.—Also, a bay on the coast of Catalonia. N. lat. $42^{\circ} 24'$. E. long. $3^{\circ} 6'$.—Also, a town of South America, in the province of St. Martha; 62 miles S. of St. Martha.—Also, a town of South America, in the province of Caraccas; 10 miles N.N.W. of Varinas.—Also, a town of South America, in the government of Caraccas; 20 miles N.E. of Segovia Nueva.

PUEBLO de Sanabria, a town of Spain, in the province of Leon; 37 miles S.W. of Astorga.

PUEBLO Viejo, a town of Mexico, in the province of Nicaragua; 40 miles N.W. of Leon.

PUECHBERG, a town of Austria; 8 miles S. of Kirchschlag.

PUEGOS, or **SQUIOR**, one of the Philippine islands, small, but well-peopled with brave and warlike inhabitants; 50 miles N. from the W. part of Mindanao.

PUELCHES, inhabitants of the mountains of Chili, in South America, now united with the state of Araucana, who are more rude and savage than the others. Their name signifies Eastern men. They are of a tall stature, and fond of the chase, so that they often change their habitations, and even detach colonies to the eastern sides of the Andes, as far as the lake Naguelgapi, and the shores of the Atlantic, in the wide plains of Patagonia. The Araucans highly esteem these mountaineers for their bold services in war, and their lasting fidelity to the confederacy.

PUENTE de Arcobispo, a town of Spain, in New Castile, on the Tagus; 50 miles W.S.W. of Toledo.

PUENTE del Congostor, a town of Spain, in Old Castile; 37 miles W.N.W. of Avila.

PUENTE *d' Eume*, a town of Spain, in Galicia ; 8 miles N. of Betanzos.

PUENTE *de Gonzalo*, a town of Spain, in the province of Cordova ; 13 miles W. of Lucena.

PUENTE *de la Reyna*, a town of Spain, in Navarre ; two miles S.S.W. of Pamplona.

PUERCO, an island in the bay of Panama, behind which vessels may anchor with safety.

PUERCO. See GREEN KEY.

PUERIALIMENTARIUM. See ALIMENTARIUM.

PUERILE STYLE. See STYLE.

PUERILITY, in *Discourse*, is by Longinus defined to be a thought, which, by being too far fetched, becomes flat and insipid. Puerility, he adds, is the common fault of those who affect to say nothing but what is brilliant and extraordinary.

PUERITIA, or CHILDHOOD, in the *Civil Law*, denotes the age of minors from seven to fourteen, which was divided into two equal parts ; from seven to ten and a half, which was *etas infantie proxima* ; and from ten and a half to fourteen, which was *etas pubertati proxima* ; during which stage they were punishable, if found to be *doli capaces*, or capable of mischief ; but with many mitigations, and not with the utmost rigour of the law. See AGE.

PUERO, in *Geography*, a town of the province of Darien ; 32 miles E.N.E. of St. Maria de Darien.

PUERORUM EPISCOPUS. See EPISCOPUS and BOY-BISHOP.

PUERPERAL CONVULSIONS, in *Medicine*, convulsions occurring during, or immediately previous to the act of parturition.

Under the article CONVULSIONS we mentioned briefly, that, in the puerperal state, women are liable to a severe and dangerous modification of these affections, which requires a prompt and decided practice. The importance and peculiarity of the convulsive paroxysms, under these circumstances, as well as the prevalence of some difference of opinion among respectable authors on the subject, render a more particular notice of them necessary. Without repeating, therefore, any of the general doctrines before detailed, we shall briefly state the circumstances peculiar to convulsions occurring in the puerperal state.

The great general sympathy of the whole habit, with the uterine system in females, is a subject of common observation ; and the mobility of the nervous system is considerably increased in connection with the changes that take place in the uterus during the progress of pregnancy ; whence the constitution is unusually liable to suffer, during this period, from any inordinate causes of irritation. This increased irritability of the habit, then, may be considered as the principal *predisposing* cause of puerperal convulsions : but the predisposition is farther increased by the existence of a sanguine temperament, and an habitual tendency to nervous and hysterical complaints, as well as by a plethoric condition. In constitutions of this nature, therefore, the occurrence of convulsions should be more actively anticipated, when the following premonitory symptoms are observed.

If, at the beginning or during the progress of labour, the patient complains of giddiness, dimness of sight, of a ringing noise in the ears, and violent piercing head-ache, and more especially if she sighs deeply, and exhibits signs of incoherence of ideas, or slight delirium, the probability of approaching convulsions may be foreboded. This foreboding will be strengthened, if there is at the same time a fullness of the neck, with an enlargement of the features of the face, and a staring or protrusion of the eyes, implying a considerable determination of the fluids to the head. Sometimes also

acute pains at the stomach, and vomiting, are among the precursors of the fits, and sometimes there are rigors or shiverings at the return of the pain. These symptoms usually continue for some hours, and occasionally days, before the accession of the convulsive paroxysms : but at length some slight twitches are observed about the mouth and eye-lids, which terminate in the complete and universal convulsion of the body.

The paroxysm of puerperal convulsions is commonly considered as in all respects analogous to that of epilepsy, occurring in other circumstances. (See EPILEPSY.) And in a great measure this view is correct : both Dr. Denman and Dr. Bland, however, have pointed out a strong analogy to apoplexy, which usually characterises the puerperal disease, and which, therefore, demonstrates the peculiar practice which it requires. This is marked by the presence of *stertor*, or snoring, and a comatose condition, in the intervals, usually deemed peculiar to apoplexy ; and together with the frothing of the mouth, which is common to this convulsion and epilepsy, Dr. Denman remarks, " there is also a sharp hissing noise, produced by fixing the teeth, and by the sudden motion of the under lip, as if attempts were made to retract the saliva back into the mouth ; and by this noise," he adds, " I have generally been able to discover the state of the patient, though she was in another room." (Introduction to Midwifery, vol. ii. p. 202. See also Bland's Observations on human and comparative Parturition, p. 138.) Sometimes, however, the comatose state does not continue through the intervals between the paroxysms, but the patient recovers more or less completely the use of her senses.

The fits continue to recur at longer or shorter intervals, if remedies are not employed, according to the state of the system in general, and to the action of the uterus in particular, with which they are much connected : and they will thus return repeatedly, in some cases, until the delivery is accomplished, in which they assist like ordinary pains ; and then they generally cease spontaneously, for they rarely occur after delivery. In some cases, the proper remedies have had the effect of preventing a second paroxysm : but in others, the first fit has terminated the life of the patient, or, after repeated paroxysms and recoveries, death has at length occurred in the fit. The prognosis, indeed, is at the best extremely uncertain : for such is the dangerous nature of the paroxysm, that, although the symptoms seem to wear the most favourable aspect, any single accession may produce death. Yet Dr. Denman has justly remarked, that the danger is not exactly to be estimated by the frequency of the returns ; since this chiefly depends upon the frequency of the action of the uterus, and not upon an increase of the cause of the convulsions. Mauriceau deduces his prognosis more particularly from the condition of the patient in the intervals of the accessions : if she lies in a state of total insensibility between the fits, the danger, he believes, is much greater than when she returns to her usual sensibility. *Traité des Maladies des Femmes grosses*, liv. ii. p. 335.

Under the state of morbid irritability already noticed, several exciting causes appear to produce the convulsions in different instances. The painful distension of the uterine passages, and particularly of the *os uteri*, which is the seat of much irritability, is the most general source of the convulsive actions ; whence these convulsions are much more common in a first labour, than in subsequent parturitions, when the relaxation is more easily accomplished ; and it has been frequently remarked, that any attempt to assist the dilatation of the *os uteri* has brought on, continued, or increased the convulsions. Violent mental emotions have also been observed to produce these attacks. A severe fit of anger,

for instance, has been known to induce them. But the depressing passions appear to be more frequently the origin of them, such as grief, and the apprehension of future misery. "Unmarried women," Dr. Denman observes, "whose unfortunate situations render pregnancy an evil instead of a blessing," are peculiarly liable to be attacked by convulsions during labour, and to become maniacal after it. Sudden terror has also operated as an exciting cause. Blows, falls, and even less violent corporeal agitations, such as dancing, or other considerable muscular exertions, have occasionally given rise to convulsions about the period of delivery: and internal irritations, such as indigestible food, or flatulent congestions in the alimentary canal, or even distension of the urinary bladder, have proved the cause of puerperal convulsions in those predisposed in the way above-mentioned.

The immediate or *proximate cause* of these convulsions, however, is, without doubt, an over-excitement of the brain, from a great determination of blood to that organ. Dissection after death, according to Dr. Denman, has usually exhibited a general turgidity of the vessels of the brain, and of the membranes surrounding it; and Mr. Hewson, in one case, found a small effusion of blood on its surface.

The foregoing view of the symptoms, causes, and nature of the disease, seems to lead, then, distinctly to three indications, with a view to the prevention and cure of puerperal convulsions; *viz.* 1. To obviate the great determination of blood to the head; 2. To remove all sources of irritation, external and internal, as far as is practicable: and 3. To diminish the morbid irritability of the system.

The *first* indication, and, indeed, the first great object of practice in this formidable disease, is the removal of the over-distension of the vessels of the brain. This end is obtained by *blood-letting*, which is to be employed freely, according to the obvious marks of determination to the head. It may be performed either in the arm, or from the jugular vein; but, on the whole, the latter is preferable. One copious bleeding has often entirely removed the convulsions, especially from the vessels in the immediate vicinity of the brain; and accident has sometimes effected, what art had been too timid to accomplish. Dr. Denman mentions a case which was related to him by Dr. Bromfield, in which, after a bleeding from the arm had been employed with little benefit, the orifice of the vein was re-opened during a subsequent convulsion, and a considerable quantity of blood lost; from which time the convulsions ceased. This evacuation should, therefore, be repeated, when the first operation has not produced adequate relief, unless some unusual state of the constitution absolutely interdict it.

The *second* indication may be fulfilled at the same time, and the means will consist in the free ventilation of the room, by which the irritation of heat and foul air will be removed; in the free evacuation of the bowels by purgatives and glysters; in the use of the catheter, where the bladder appears to be distended with urine; in the application of fomentations to the abdomen, or the use of the warm-bath, where there are cramps or pains in the belly; and in the endeavour to tranquillize the mind, by removing all causes of anger, and opposing the tendency to grief, fear, or despondency, by inspiring hope and confidence.

The *third* indication, with a view to relieve the morbid irritability of the whole frame of the patient, can only be attempted with success, or even with safety, after a sufficient evacuation by blood-letting has been accomplished. The administration of opiates or other anodynes, previous to the reduction of the morbid fullness of the brain, can only be

expected to increase the evil, by the stimulation which is combined with their narcotic power. When the first object has been effected, however, a full dose of laudanum, *i. e.* from twenty-five to forty drops, may be administered with considerable advantage. Perhaps, however, the hyoscyamus, which is possessed of less stimulant power, and has no tendency to confine the bowels, would be preferable to the preparations of opium in such cases. Dr. Hamilton, the present professor of midwifery at Edinburgh, is in the habit of uniting camphor with the opium, under these circumstances, or of giving camphor alone, which he conceives to be less stimulating and equally soothing. The warm-bath may be resorted to if convenient, for the purpose of calming the general irritability, and warm fomentations are sometimes useful for the same purpose; but in truth, after the immediate source of the convulsions is removed by blood-letting, these secondary expedients are of minor importance.

It may be proper to observe, before we conclude, that some practitioners have asserted the propriety of assisting the delivery immediately, without waiting till the os uteri is sufficiently dilated by the natural efforts to admit of a ready extraction of the child. But both reason and experience have decided on the propriety of desisting from any attempt to dilate the os uteri, since the very attempt is liable to excite the paroxysms. If the first stage of labour be past, indeed, before the convulsions come on, the passage will be so much dilated as to admit of turning (especially if the membranes be not broken), or of delivery by the forceps or vectis. The comparative advantages of waiting have been clearly stated by Drs. Bland and Denman, in the works to which we have referred in the course of this article.

PUERPERAL Fever, in *Midwifery*, a fever incident to lying-in-women, and attacking them during or soon after labour. For its history and treatment, see *LABOUR, Natural*.

The puerperal fever is, in fact, connected with an inflammation of the peritoneum, or membrane lining the abdomen and surrounding the intestines, and differs from ordinary peritoneal inflammation only in the circumstances peculiar to the puerperal state, which increase the danger of the disease. The term *puerperal fever* should, therefore, be changed for that of *puerperal peritonitis*, or *peritonitis puerperarum*, which conveys a more correct notion of the nature of the disease. See *PERITONITIS*.

PUERS, in *Geography*, a town of France, in the department of the Two Nethes, and chief place of a canton, in the district of Malines. The place contains 3664, and the canton 15,067 inhabitants, on a territory of 85 kilometres, in nine communes.

PUERTO de Acazut, La, a harbour on the coast of Peru. N. lat. 14°.—*P. de los Angeles*, a harbour of the Pacific ocean, on the coast of Mexico. N. lat. 15° 30'.—*P. del Baylio Bucareli*, a large bay on the W. coast of the Prince of Wales's Archipelago, discovered in 1775 by signor Quadra, in which is a great number of small islands. N. lat. 55° 14' to 55° 40'. E. long. 226° 12' to 227° 5'.—*P. de Bazan*, a bay on the S.W. coast of the Prince of Wales's Archipelago. N. lat. 54° 49'. E. long. 227° 16'.—*P. de Cabanas*, a harbour on the N. coast of the island of Cuba. N. lat. 23° 4'. W. long. 83° 6'.—*P. del Canaveral*, a harbour on the S. coast of Pitt's Archipelago, in the Canal de Principe. N. lat. 53° 32'. E. long. 230° 16'.—*P. Cabello*. See *PORT Cavallo*.—*P. Calvo*, a harbour on the coast of Brasil. S. lat. 9° 10'. W. long. 34° 50'.—*P. Carnero de Tucape*, a harbour on the coast of Chili. S. lat. 37° 40'.—*P. Claro*, a bay of the Pacific ocean, on the coast of Darien. N. lat. 6° 52'.—*P. del*

Coral, a harbour on the coast of Chili, a little N. of Valdivia.—*P. Cordova y Cordova*, a large bay of the North Pacific ocean, on the S. side of the Prince of Wales's Archipelago. N. lat. $54^{\circ} 42'$ to $55^{\circ} 6'$. E. long. $227^{\circ} 28'$ to 228° .—*P. Cordova*, a bay on the E. coast of Prince William's Sound, between Hawkins's island and the W. coast of America. Entrance N. lat. $60^{\circ} 37'$. E. long. $214^{\circ} 13'$.—*P. Deseada*. See *PORT Desire*.—*P. Falso*, a bay of the Pacific ocean, on the coast of New Albion. N. lat. $32^{\circ} 45'$. E. long. $243^{\circ} 6'$.—*P. Escondido*, a harbour in the Pacific ocean, on the coast of Mexico. N. lat. $16^{\circ} 12'$.—*P. Gravina*, a bay or inlet of the Pacific ocean, on the W. coast of N. America, and E. side of Prince William's Sound. Entrance N. lat. $60^{\circ} 41'$. E. long. $214^{\circ} 11'$.—*P. del Governador*, a harbour on the coast of Chili, at the mouth of the Longotoma. S. lat. $31^{\circ} 30'$.—*P. del Ingles*, a harbour of the Pacific ocean, on the coast of Mexico. N. lat. $8^{\circ} 56'$.—*Alfo*, a harbour on the coast of Chili, N. of the Caldera. S. lat. $26^{\circ} 50'$.—*P. de los Inocentes*, a harbour on the W. coast of the island of Madre de Dios, in the Pacific ocean. S. lat. $50^{\circ} 44'$.—*P. de Machala*, a harbour on the coast of Peru. S. lat. $1^{\circ} 20'$.—*P. Magno*, a small sea-port on the W. coast of the island of Iviça, seven miles N. of Iviça. N. lat. $38^{\circ} 58'$. E. long. $1^{\circ} 22'$.—*P. de Malamacor*, a narrow pass in the mountains of Spain, N. of Valencia.—*P. Maria*, a sea-port on the S. coast of Jamaica. N. lat. $18^{\circ} 26'$. W. long. $76^{\circ} 40'$.—*P. Marin*, a town of Spain, in Galicia, on the Minho; 12 miles S. of Lugo.—*P. de Margues*, a bay of the Pacific ocean, on the coast of Mexico. N. lat. $17^{\circ} 10'$.—*P. de Mota*, a harbour on the S. coast of the island of Cuba. N. lat. 20° . W. long. $77^{\circ} 23'$.—*P. de Monte Moreno*, a harbour on the W. coast of America. S. lat. $23^{\circ} 8'$.—*P. de la Natividad*, a harbour on the coast of Chili, at the mouth of the Lora. S. lat. $34^{\circ} 44'$.—*P. Natividad*, a harbour on the W. coast of America, in the province of Xalisco. N. lat. $19^{\circ} 44'$.—*P. de Ocana*, a town of South America, in the province of St. Martha, on the river Madalena; 30 miles W.N.W. of Ocana.—*P. Papudo*, a harbour on the coast of Chili. S. lat. $32^{\circ} 20'$.—*P. de la Posseñion*, or *Realijo*, a bay of the Pacific ocean, on the coast of Mexico. N. lat. $12^{\circ} 36'$.—*P. del Principe*. See *VILLE del Principe*.—*P. de Pinas*, a harbour on the Pacific ocean, on the coast of Darien. N. lat. $7^{\circ} 30'$.—*P. Quemado*, a harbour on the coast of Darien, in the Pacific ocean. N. lat. $7^{\circ} 10'$.—*P. Quintero*, a harbour on the coast of Chili. S. lat. $32^{\circ} 42'$.—*P. Real*, a sea-port town of Spain, in the province of Seville, near the mouth of the Guadalete; six miles E. of Cadiz. N. lat. $36^{\circ} 32'$. W. long. $6^{\circ} 30'$.—*P. Revilla Gigedo*, a bay on the N.W. part of Prince William's Sound, on the W. coast of N. America. N. lat. $60^{\circ} 56'$. E. long. $213^{\circ} 25'$.—*P. de St. Antonio*, a bay on the coast of Darien, in the Pacific ocean. N. lat. $6^{\circ} 28'$.—*P. de St. Antonio*, a harbour on the coast of Mexico. N. lat. $19^{\circ} 55'$.—*Alfo*, a harbour on the coast of Chili. S. lat. $53^{\circ} 8'$.—*P. St. Juan*, a harbour on the Pacific ocean, on the coast of Mexico. N. lat. $11^{\circ} 32'$.—*P. St. Martin*, a harbour in the gulf of California, on the coast of Mexico. N. lat. $28^{\circ} 15'$.—*P. Salinas*, a bay of the Pacific ocean, on the coast of Mexico. N. lat. $16^{\circ} 36'$.—*P. St. Pedro*, a large bay on the Atlantic, on the coast of Brasil, at the mouth of Rio Grande. S. lat. $31^{\circ} 40'$.—*P. St. Yago*, a sea-port on the W. coast of Mexico, in the province of Xalisco; 25 miles S. of Purification. N. lat. $19^{\circ} 30'$. W. long. $105^{\circ} 46'$.—*P. de Santa Maria, El*, a sea-port town of Spain, situated in the bay of Cadiz, containing one parish, a hospital, five convents, and from 8000 to

10,000 inhabitants; whose chief trade is salt; seven miles N. of Cadiz. N. lat. $36^{\circ} 38'$. W. long. $6^{\circ} 25'$.—*P. de St. Vicente*, a bay on the coast of Chili, S. of Concepcion.—*P. de Tintoque*, a harbour in the Pacific ocean, on the coast of Mexico. N. lat. $21^{\circ} 3'$.—*P. de Topocalma*, a harbour on the coast of Chili. S. lat. $34^{\circ} 8'$.—*P. de Touro*, a harbour on the coast of Brasil. S. lat. $5^{\circ} 1'$. W. long. $35^{\circ} 20'$.—*P. de Valdes*, a bay on the N. part of Prince William's Sound, about 14 miles long and two broad.—*P. Vermejo*, a harbour on the coast of Peru. S. lat. $9^{\circ} 42'$.—*P. Velho*, a port on the coast of Brasil. S. lat. $16^{\circ} 10'$.—*P. Viejo*, a harbour on the coast of Peru; 10 miles E.N.E. of Monte Christi. S. lat. $9^{\circ} 42'$.—*P. de la Velas*, a harbour in the Pacific, on the coast of Mexico. N. lat. $10^{\circ} 35'$.—*Alfo*, a harbour on the coast of Peru. S. lat. $25^{\circ} 30'$.

PUERTOLAS, a town of Spain, in Aragon; eight miles N. of Ainsa.

PUERTOS, Los, a town of South America, in the province of Venezuela, E. of the river, which forms a communication between the gulf of Venezuela and lake Maracaybo; 15 miles N.N.E. of Maracaybo.

PUFF-BALL, the common English name for the fungus pulveris lentus, or lycoperdon. See **LYCOPERDON**.

The dust contained within this body, (which, when it is crushed, flies out in an inconceivably fine powder, in form of a cloud of smok,) when examined by the microscope, appears to be a multitude of regularly figured, though extremely small bodies. These require the most powerful magnifiers to distinguish them, and are found to be little globules of an orange colour, and somewhat transparent; and so small, that the cube of the diameter of a hair would be equal to a hundred and twenty-five thousand of them. In other species of this mushroom, the globules are evidently seen to be so many puff-balls, being of a darker colour, and having each a little stalk or tail; by means of these stalks they penetrate into the ground, when shed from their parent plant.

The dust of these mushrooms is very hurtful to the eyes, and we have had instances of persons being blinded for a long time by it, with violent pain, swelling and inflammation; and this is probably owing to the sharpness of these almost inconceivably minute stalks or tails. Baker's Microscope, p. 255.

PUFFENDORFF, SAMUEL, in *Biography*, a learned historian and jurist, was born in 1631 at Flåh, a village of Misnia, near Chemnitz, where his father was a Lutheran minister. He received the early part of his education under his father, and was sent to Leipzig to study divinity, which he soon abandoned for the law. After residing some time at this university he removed to Jena, and pursued the mathematics under the celebrated Weigel, and then applied himself to the law of nations, and the politics of the German empire, in which he became thoroughly versed. In 1658 he was appointed governor to the sons of Coyer, ambassador of the court of Sweden to that of Denmark, whom he accompanied first to Leyden, and then to Copenhagen. When war broke out between the two kingdoms, all the household of the Swedish ambassador was put under an arrest. Puffendorff, during the eight months of his confinement, employed himself in commenting on the work of Grotius "On the Rights of War and Peace," and the political writings of Hobbes, and having arranged his observations, he published them in 1660 with the title of "Elements of Universal Jurisprudence." By this essay he acquired so much reputation, that the elector palatine founded, in his favour, a professorship of natural law in the university of Heidelberg.

Heidelberg. In 1670 Charles XI., king of Sweden, conferred upon him the same office in the university of Lunden. While he was in that situation, the publication of his great work on the law of nations, brought upon him an attack from professor Beckmann, who printed a libel against him, for which he was banished the kingdom. Enraged at this punishment, he sent Puffendorff a challenge, of which he wisely took no notice. When Schonon became the seat of war, he quitted Lunden, and went to Stockholm, where he was appointed royal historiographer and counsellor of state, with the title of baron, and was engaged in writing on Swedish history. He finally accepted the invitation of the elector of Brandenburg to reside at his court as counsellor of state, with the charge of writing the history of the great elector, Frederic-William. Baron Puffendorff died at Berlin in 1694, leaving behind him a character of great integrity and honour. His historical works are as follow: "An Introduction to the History of the principal States at present in Europe," with a "Continuation." "History of Sweden from the Expedition of Gustavus Adolphus into Germany to the Abdication of Christiana." "History of Charles Gustavus." "History of Frederic-William II., the great Elector of Brandenburg." This was published in two vols. fol. in 1696; it was drawn from the archives of the house of Brandenburg, underwent many retrenchments in the course of printing, and complete copies are now rarely to be met with. Of his works on law are "Elementorum Jurisprudentiæ Universalis:" "A Treatise on the Law of Nature and Nations." This work maintains a place among the leading publications on the subject, and it is allowed, that the author has rectified and extended the principles of Grotius. An abridgment of this work was published under the title of "Duties of a Man and a Citizen."

PUFFENDORFF, ISAAH, brother of the preceding, born in 1628, was educated at Leipzig, where he distinguished himself, and took the degree of M.A. After various changes of fortune, he was made governor of the young count of Koningmark, and was afterwards chancellor of the duchy of Bremen. In 1686 he was appointed ambassador of the king of Denmark to the diet of Ratisbon, and died there in 1689. He is the author of a satirical work, entitled "Anecdotes of Sweden, or Secret History of Charles XI." Moreri.

PUFFIN, in *Ornithology*, a name by which some call the *Anas arctica Clusii*, or the northern duck, or *Alca arctica* of Linnæus.

This bird weighs about twelve ounces; its length is twelve inches, and the breadth from tip to tip of the wings extended, twenty-one inches; the bill is short, broad at the base, compressed on the sides, and running up to a ridge, triangular, and ending in a sharp point; the base of the upper mandible is strengthened with a white, narrow, prominent rim, full of small holes; the bill near the head is of a blueish-grey, and the lower part red; in the former is one transverse furrow, in the latter three furrows; and the size of the bill varies in different birds; the nostrils are long and narrow; the irides are grey, and the edges of the eyelids of a fine crimson; on the upper eye-lid is a singular callous substance, grey, and of a triangular form; on the lower is another of an oblong form; the crown of the head, whole upper part of the body, tail and covert-feathers of the wing, are black; the quill-feathers are of a dusky hue; the cheeks are white, and full of feathers; the chin of the same colour, bounded on each side by a broad bed of grey; from the corner of each eye is a small separation of the feathers, terminating at the back of the head; the neck is

encircled with a broad collar of black, but the whole lower part of the body is white; the tail is composed of sixteen feathers, and black; the legs small, of an orange colour, and placed so far behind as to render it incapable of standing otherwise than in an erect position, resting not only on the foot but the whole length of the leg, which circumstance makes the rise of the puffin from the ground very difficult; but when it gets on the wing, few birds fly longer or stronger.

These birds frequent the coast of several parts of Great Britain and Ireland, but are most numerous in Priestholm isle, off the coast of Anglesea. They are birds of passage, resorting there annually about the fifth or tenth of April; quit the place, and return twice or thrice before they settle to burrow the first week in May; but some dislodge the rabbits, and make use of their holes. The task of burrowing falls chiefly to the males, which also assist in incubation. The first young are hatched in the beginning of July, to which the old ones discover a very strong affection, which ceases at the stated time of migration, taking place punctually about the eleventh of August, when they leave such young as cannot fly to the mercy of the peregrine falcon. They lay only one egg, and the eggs are of very different forms. The flesh of these birds is exceedingly rank, as they feed on weeds and fish, especially sprats; but when pickled and preserved in spices, they are admired by those who love high eating. Dr. Caius tells us, that in his time the church allowed them in Lent instead of fish. They are taken by digging them out, or drawing them from their burrows with a hooked stick. Their noise, when taken, is very disagreeable, being like the effort of a dumb person to speak. The winter residence of this genus is but imperfectly known; it is probable they live at sea, in some more temperate climate, remote from land, forming those multitudes of birds which navigators observe in many parts of the ocean; they are always found there at certain seasons, retiring only at breeding time: repairing to the northern latitudes; and during that period are found as near the pole as navigators have penetrated. Pennant.

PUFFIN *Manks*, or *Shear-water*. See PROCELLARIA *Puffinus*.

PUFFIN'S *Island*, in *Geography*, a small island near the W. coast of Ireland; 4 miles S. of Brea Head.

PUFFINET, in *Ornithology*, the name of a bird known among authors by that of the *columba Groenlandica*, or the Greenland or sea turtle-dove. See COLUMBA.

It is common on the northern coasts, and is black all over, except two small spots on its head; but it is pretended by some, that in winter it turns white.

PUG-Piling, is the same with *dove-tailed* or *pile-planking*; which see.

PUGANORE, in *Geography*, a town of Hindoostan, in Myfore; 58 miles N.W. of Arcot.

PUGET'S ISLAND, a narrow island about five miles in length, discovered by Capt. Vancouver in Columbia river, about 24 miles from its mouth.

PUGET'S *Sound*, an inlet of several branches, and containing many islands, S. of Admiralty inlet, within Georgia Sound. N. lat. 47° 10'. E. long. 237° 25'.

PUGET-THENIERS, a town of France, and chief place of a district, in the department of the Maritime Alps. The place contains 914, and the canton 2133 inhabitants, on a territory of 142½ kilometres, in 6 communes.

PUGGAR, a town of Bengal; 30 miles W.N.W. of Ramgur.

PUGIL, from *pugillus*, *little hand*, among *Physicians*, &c. a measure of flowers, seeds, or the like matters, containing

so much as may be taken up between the thumb and two fore-fingers.

The pugil is esteemed the eighth part of the *manipule* (which see), or handful; though some confound pugil with manipulus, and use it for a handful. The French frequently call it *pincée*, a *pinch*.

PUGLIENZA, in *Geography*. See POLLENZA.

PUGNANI, GAETANO, in *Biography*, chamber musician and first violin to the court of Turin. He was of the Tartini school, and formed many great scholars upon his instrument, among whom we need only mention fig. Viotti as an illustrious example.

Pugnani went to Paris in 1754, and pleased and astonished extremely at the Concert Spirituel, both as a composer and performer of his own pieces.

In 1763 he published at Amsterdam three quartets, opera prima. In 1765 six duos for two violins, opera secunda; and six trios for two violins and a base, opera terza. A second set afterwards of six duets, opera quarta. His opera quinta was six sonatas for the harpsichord, with a violin accompaniment. Six symphonies, opera sexta. In 1770 six violin solos, opera septima. Three quintets for two violins, two flutes, and a base, opera octava. Six solos, opera nona, for the violin, besides a great number of solo concertos for his own performance, which still remain in manuscript.

In 1768 he came to England, and led some time at the Opera. His manner of playing there is not yet forgotten. He was very near-sighted; but grasped a whole page generally by a single glance, which gave him full leisure to look around him for admiration: and with a nose long enough for a *Muso*, he either thought himself or wished others to think him an Adonis. But he had here at this time a most powerful rival in talents and personal appearance in Giardini. It appeared to us in his solos and concertos that Pugnani had not that great and firm command of the finger-board, which Giardini and some other eminent performers on the violin have since manifested. In his shifts he was never sudden nor frequent; but having attained a new position, he never quitted it till he had played all the notes within his reach, which kept his hand stationary sometimes for a whole page.

While at the head of our Opera band, he composed a comic opera called "Nanette e Lubino." But though an able professor and writer for his own instrument, he seemed to have begun writing for the voice too late in life to arrive at great excellence in vocal compositions. He since that time has, however, composed several serious operas for different parts of Italy; among the rest "Demofonte" for Turin, in 1788. We have heard nothing of him since the revolution and dethroning of his sovereign.

PUGNAX AVIS, in *Ornithology*, the name of the bird called in English the *ruff*, and the female of which is the *reeve*. It has its Latin name from its quarrelsome disposition, the males being always fighting. See TRINGA *Pugnax*.

PUGNO CHIUSO, in *Geography*, a town of Naples, in the province of Capitanata; 5 miles S. of Vicste.

PUICELEY, a town of France, in the department of the Tarn; 10 miles N.W. of Gaillac.

PUJET, LE, a town of France, in the department of the Var; 9 miles S. of Brignoles.

PUIGUILLIEN, a town of France, in the department of the Dordogne; 10 miles S.W. of Bergerac.

PUINORMAND, a town of France, in the department of the Gironde; 12 miles N.E. of Libourne.

PUJOLS, a town of France, in the department of the Gironde, and chief place of a canton, in the district of Libourne; 12 miles N.E. of Libourne. The place contains

1012, and the canton 10,473 inhabitants, on a territory of 122½ kilometres, in 16 communes.—Also, a town of France in the department of the Lot; 10 miles N. of Agen.

PUIS *Darrein Continuance*, *q. d.* since the last adjournment, in *Law*, a plea which the defendant may plead even after issue or demurrer joined, when some new matter arises, at the day given for his next appearance. Pleas of this kind, when brought to a demurrer in law, or issue of fact, shall be determined in like manner as other pleas.

PUISEAUX, in *Geography*, a town of France, in the department of the Loiret, and chief place of a canton, in the district of Pithiviers; 9 miles E. of Pithiviers. The place contains 1926, and the canton 7085 inhabitants, on a territory of 105 kilometres, in 14 communes.

PUISNE, PUNY, in *Law*, a younger-born; or a child born after another.

The word is French, in which language it bears the same signification.

Puisne is not only applied to the second, third, fourth, &c. with regard to the first; but to the third with regard to the second, &c. The last of all is called absolutely *cadet*.

In the like sense we say a puisne judge, a puisne counsellor. Three of the judges of the court of common pleas are called puisne justices; and also three of the barons of the court of exchequer are distinguished by the same appellation.

PUISSERGUIER, in *Geography*, a town of France, in the department of the Herault; 9 miles W.N.W. of Beziers.

PUKER, a town of Bengal; 25 miles N.W. of Moorshedabad.—Also, a town of Hindoostan, in the circar of Bickaneer; 35 miles N. of Bickaneer.

PUKING, a cant word for a nausea, or disposition to vomit. See VOMITING.

PUKIS, in *Geography*, a town of Sweden, in the government of Abo; 7 miles E. of Abo.

PUKKILA, a town of Sweden, in the province of Nyland; 16 miles N. of Borgo. N. lat. 16° 20'. E. long. 25° 32'.

PUKOGNO, a town of Russia, in the government of Olonetz; 68 miles E.N.E. of Pudoga.

PUL, in *Commerce*, a general name which the Persians give to all the copper monies current in that empire.

Olearius, who was at Ispahan in 1637, in the retinue of the ambassador of Holstein, assures us, that each city in Persia has its several copper money, marked with its particular badge, which is only current in that district, and is changed every year. At the beginning of each year, which is at the vernal equinox, all the old money is cried down, and the new appears in its place.

Both the emperor and the state find their interest in this frequent change: the first, in that he only gives at the rate of 17*d.* sterling *per* pound for copper; yet delivers it out coined in kabesqui and demi-kabesqui, at about 2*s.* *per* pound: the second, in that the copper money is by this means less abundant, being reduced each year to nearly the same quantity.

PULAHA, the name of one of the personages often mentioned in Hindoo sacred writings, as the "ten lords of created beings," sometimes called Bramadikas, or sons of Brahma, and Prajapatis, or lords of creatures. On other occasions seven only are mentioned, and they have been reasonably considered as the same personages as those called Menus, Munis, and Rishis. See MENU, MUNI, and RISHI.

PULANSA, in *Geography*, a town of Hindoostan, in Guzerat; 44 miles N. of Radimpour.

PULASHI, a county of Kentucky, containing in 1800,

3361, and in 1810, 6897 inhabitants.—Also, a county of Georgia, containing in 1810, 2093 inhabitants.

PULASTYA, in *Mythology*, the name of one of the earliest created beings, according to the sacred books of the Hindoos, hence called Bramadikas, or children of Brahma. They are ten in number, and their names are enumerated under the article **MUNI**. See also **PULAHIA** and **PAULASTYA**.

PULBAIT, in *Geography*, a town of Hindoostan, in Oude; 32 miles N. of Kairabad.

PULCHER PISCIS, in *Ichthyology*, a name given by Gaza to the fish commonly known by the name of the *uranoscope*, or star-gazer. See **URANOSCOPIUS**.

It is a species of the trachinus, and distinguished by Artedi by the name of the trachinus with many beards on the lower jaw.

PULCHERIA, in *Biography*, a Roman empress, was a daughter of Arcadius, emperor of the East. In the year 414, being then only 16 years of age, she was declared Augusta, or empress, by her brother Theodosius II., who was two years younger than herself, and immediately took the lead in the government. To this elevated station she was entitled by talents, which were rarely found, at that period of the declining empire, in the possessors of the throne, and which rendered her the only worthy descendant of the Great Theodosius. She was elegantly skilled in the Greek and Latin languages, spoke and wrote with facility, was indefatigable in business, and by her vigilance and prudence maintained the public tranquillity during a long administration. She was likewise very devout, and, with her two sisters, early took a vow of perpetual virginity. She superintended the education of her brother, and wished to render him worthy of the high dignity to which he was born. At his death, in 450, Pulcheria was unanimously proclaimed empress of the East; but as a female reign was yet unknown to the Romans, she chose, after exercising her authority, by putting to death the unworthy Chrysaphius, to admit as a partner on the throne the senator Marcianus, whom at the same time she made her husband, though he was so only in title. By her authority the general council of Chalcedon was assembled in 451, the fathers of which conferred on her the epithets of guardian of the faith, and a new Helena. She died in 454, at the age of 56, leaving her vast wealth to the church and the poor. On this account, and for her zeal for orthodoxy, a place was assigned her among the faints of both the Greek and Latin churches. *Univer. Hist.* Gibbon.

PULCI, LUIGI, an Italian poet, was the youngest of three brothers of a noble Florentine family, all of whom cultivated polite literature. Luigi was born in 1431. Little is known of his life, except that he lived on intimate terms with Lorenzo de Medici and Angelo Poliziano. It was at the desire of Lucretia, mother of Lorenzo, that he undertook the composition of his principal poem entitled "*Morgante Maggiore*." This was first printed at Venice in 1488. It is said to display much invention and poetical imagination, with a purity of style with respect to Tuscan proverbial phrases, of which it has great abundance. The best edition is that of Paris, with the date of London 1768. There are other poems of Luigi Pulci in print, and among them, sonnets in conjunction with Matteo Franco, another Florentine poet in the burlesque style. Of the two brothers, **BERNARDO** wrote an elegy on the death of Cosmo de Medici, and another on the beautiful Simonetta, a translation of Virgil's *Eclogues*, and a poem of Christ's passion. **LUCA** wrote stanzas on the tournament of Lorenzo de Medici; heroic epistles; a pastoral romance entitled "*Driadeo d'Amore*,"

and an epic romance, probably the first of the kind that appeared in Italy, entitled "*Il Ciriffo Calvanco*."

PULE, LE, in *Geography*, a bay on the W. coast of the island of Jersey.

PULECA, a town of Bengal; 13 miles S. of Kishenagur.

PULEGIUM, in *Botany*. See **PENNY-ROYAL**.

PULENTE, LA, a bay on the W. coast of the island of Jersey; 3 miles W. of St. Aubin.

PULEX,—the *Flea*, in *Entomology*, a genus of insects of the order Apteræ, of which there are only two species. The generic character is as follows: Mouth without jaws or feelers, with a long inflected proboscis, covered at the base with two ovate laminæ; the sheath is two-valved, five-jointed, and concealing a single bristle; lip rounded, and fringed with reflected prickles; antennæ projecting, moniliform; it has two eyes; the abdomen is compressed; it has six legs, formed for leaping.

Species.

* **IRRITANS**. Proboscis shorter than the body. For a full account of this insect, see our article **FLEA**.

PENETRANS; the Chigoe. Proboscis as long as the body. It inhabits South America. This insect is extremely troublesome in the sugar colonies, penetrating into the skin of the inhabitants, where it lodges its eggs, and causes malignant and often fatal ulcers. The body is reddish-brown; abdomen of the female, when gravid, orbicular, and swollen to near a hundred times its usual size.

PULEX Aquaticus. See **Water BEETLE**, and **MILLEPEDES**.

PULEX-Eaters, a name given by naturalists to a sort of worms frequently found on the leaves of trees, where they devour the animals called *pulices arborei*.

Of these there are several species, which owe their origin to the eggs of different creatures; for they are none of them in their ultimate state in this their time of feeding. According to the different animals whose eggs they are hatched from, these are of different form and structure: some are hexapodes, or furnished with six feet; these belong to the beetle tribe, and finally change into beetles like the parent animals from whose eggs they sprung; others have no legs, and are produced from the eggs of flies of various kinds; and finally, others are genuine caterpillars, though small; but these are the most rare of all. The two general kinds are the hexapodes or beetle-worms, and the apodes, or fly-worms. The fly which gives origin to the last of these is a four-winged one, and takes care always to deposit her eggs in a place where there is plenty of the pulices, usually on the stalk or young branches of a tree in the midst of large families of them. The worm, as soon as hatched, finds itself in the midst of abundance of food, preying at pleasure on these animals, which are wholly defenceless. The stalks of the elder and woodbine are frequently found covered over with these pulices, and among them there may usually be found one or more of these destroyers feeding at will, sucking in the juices from their bodies, and then throwing away the dry skins. Besides the worms of this four-winged-fly, there is one of a two-winged wasp-fly, very destructive of these animals. *Reaumur's Hist. Inf. tom. i.*

PULEX-Arboreus, in *Natural History*, the name given by M. Reaumur to a very large genus of small animals. They are a kind of half-winged creatures; they have granulated antennæ, and some of them, in their most perfect state, have complete wings. These are distinguished from the others by the name of *musca pulex*, or the winged pulex.

The several species of these creatures are of different colours;

lours; some are brown, others yellow; but the most frequent are green. They all feed upon the leaves of trees, which become withered and curled up on their eroding them; and they are so common, that wherever a leaf of a tree is found curled up, or of a different form from the others, it is highly probable these animals are on it, or that it is their work. Among trees, the willow and the rose are most infected by them; and among plants, the bean and the poppy. They live a social life, multitudes of males and females being found together. The females are easily distinguished from the males, by their being thicker in the body, and having larger bellies.

It is very wonderful, that of all the known animals of the winged kind, these are the only ones which are viviparous. This is easily seen beyond a possibility of doubt; for, on examining a cluster of them together, it is a common thing to see, by the help of a small magnifier, a female in the act of parturition; and the author of this account frequently saw the young pulex protruded out, from a passage near the anus of the female, perfectly formed. He had suspected this from the total want of eggs among so numerous a tribe of animals, and from their remarkably speedy propagation, and was thus convinced of it by ocular demonstration. Reaumur's Hist. Insects, tom. i.

PULGAR, FERNANDO DE, in *Biography*, secretary, counsellor, and chronicler to Fernando and Isabel. He was a native either of the city or kingdom of Toledo. He wrote the chronicle of the Catholic kings up to 1492. This was published in 1565 as the work of Antonio de Nebrija, by his grandson, who finding it among his grandfather's papers supposed it to be his own work, and that the more readily, as Antonio had published a Latin translation. The *Claros Varones* of Pulgar have been more frequently printed. Gen. Biog.

PULICA, or PULHA, in *Geography*, a town of Austria. See BULCKAU.

PULISCHIAH, a town of Persia, in the province of Irak; 66 miles S.W. of Hamadan.

PULK, in *Rural Economy*, a provincial word signifying a puddle.

PULKA, in *Geography*, a town of Hindoostan, in the circar of Surgooja; 65 miles S.W. of Surgooja.

PULKELA, a town of Sweden, in East Bothnia; 38 miles S.E. of Brahestad.

PULLECOIL, a town of Hindoostan, in the Carnatic; eight miles E. of Tanjore.

PULLENDORF, a town of Austria; four miles E. of Mistlebach.

PULLEY, in *Mechanics*, one of the five MECHANICAL powers (see the article); consisting of a little wheel, or rundle, having a channel around it, and turning on an axis, serving, by means of a rope which slides in its channel, for the raising of weights.

The Latins call it *trochlea*; and the seamen, when fitted with a rope, a *tackle*. An assemblage of several pulleys is called a system of pulleys, or *polyspaston*: some of which are in a block or case, which is fixed; and others in a block which is moveable, and rises with the weight. The moveable wheel or rundle, is called the *sheave* or *shiver*; the axis on which it turns, the *gudgeon*; and the fixed piece of wood or iron, into which it is put, the *block*.

PULLEY, *Doctrine of the*. 1. If the equal weights W and P (*Plate XXXVI. Mechanics, fig. 11.*) hang by the cord BB upon the pulley A, whose block *b* is fixed to the beam HI, they will counterpoise each other, just in the same manner as if the cord were cut in the middle, and its two ends hung upon the hooks fixed in the pulley, at A and

A, equally distant from its centre. See MECHANICAL powers.

Hence a single pulley, if the lines of direction of the power and the weight be tangents to the periphery, neither assists nor impedes the power, but only changes its direction.

The use of the pulley, therefore, is when the vertical direction of a power is to be changed into an horizontal one; or an ascending direction into a descending one; and on the contrary.

This is found a good provision for the safety of the workmen employed in drawing with the pulley.

This change of direction by the means of a pulley has this farther advantage; that if any power can exert more force in one direction than another, we are here able to employ it in its greatest force.

Thus, *e. gr.* a horse cannot draw in a vertical direction, but draws with all its advantage in a horizontal one. By changing the vertical draught, therefore, into a horizontal one, a horse becomes qualified to raise a weight.

But the grand use of the pulley is, where several of them are combined; thus forming what Vitruvius, and others after him, call *polyspasta*; the advantages of which are, that the machine takes up but little room, is easily removed, and raises a very great weight with a moderate force.

2. If a weight W hangs at the lower end of the moveable block *p* of the pulley D (*fig. 11.*), and the cord GF goes under the pulley, it is plain that the half G of the cord bears one half of the weight W, and the half F the other; for they bear the whole between them. Therefore, whatever holds the upper end of either rope, sustains one half of the weight; and if the cord at F be drawn up so as to raise the pulley D to C, the cord will then be extended to its whole length, except that part which goes under the pulley; and consequently, the power that draws the cord will have moved twice as far as the pulley D with its weight W rises; on which account, a power whose intensity is equal to one half of the weight, will be able to support it, because if the power moves (by means of a small addition), its velocity will be double the velocity of the weight; as may be seen by putting the cord over the fixed pulley C (which only changes the direction of the power, without giving any advantage to it), and hanging on the weight P, which is equal only to one half of the weight W; in which case there will be an equilibrium, and a little addition to P will cause it to descend, and raise W through a space equal to one half of that through which P descends. Hence, the advantage gained will be always equal to twice the number of pulleys in the moveable or undermost block. So that, when the upper or fixed block *u* contains two pulleys, which only turn on their axes, and the lower or moveable block *U* contains two pulleys, which not only turn upon their axes, but also rise with the block and weight, the advantage gained by this is as four to the working power. Thus, if one end of the rope KMOQ be fixed to a hook at I, and the rope passes over the pulleys N and R, and under the pulleys L and P, and has a weight T of one pound hung to its other end at T, this weight will balance and support a weight W of four pounds, hanging by a hook at the moveable block U, allowing the said block as a part of the weight. And if as much more power be added, as is sufficient to overcome the friction of the pulleys, the power will descend with four times as much velocity as the weight rises, and consequently through four times as much space. The two pulleys in the fixed block X, and the two in the moveable block Y, are in the same case with those last mentioned; and those in the lower block give the same advantage to the power. See POLYSPASTON.

It is necessary to observe, that if the lower pulleys do not rise all together in one block with the weight, as in the cases just recited, but act upon one another, and the weight is only fastened to the lowest of them, the force of the power is very much increased, each pulley doubling it. *E. gr.* A power whose intensity is equal to 8 lb. applied at *a*, (*fig.* 12.) will, by means of the lower pulley A, sustain 16 lb.; a power equal to 4 lb. at *b*, will, by means of a lower pulley B, sustain the power of 8 lb. acting at *a*; a third power equal to 2 lb. at *c*, will, by means of the pulley C, sustain the power of 4 lb. at *b*; a fourth power of 1 lb. at *d*, will, by means of the pulley D, sustain the power of 2 lb. at *c*; and this is not altered by having its rope carried over the upper pulley or roller E. In the former cases, the force of the power is augmented in an arithmetical proportion of the number of ropes or pulleys; but in this, in a geometrical proportion.

3. If a power move a weight by means of several pulleys, the space passed over by the power will be to the space passed over by the weight, as the weight to the power.

Hence, the smaller the force that sustains a weight by means of pulleys is, the slower is the weight raised; so that what is saved in force, is spent in time.

The common methods of arranging pulleys in their blocks, may be reduced to two. The first consists in placing them one by the side of another, upon the same pin; the other, in placing them directly under one another, upon separate pins. Each of these methods is liable to inconvenience. Mr. Smeaton, in order to avoid the impediments to which these combinations are subject, proposes to combine these two methods in one. Accordingly, the pulleys are placed in each block in two tiers; several being upon the same pin, as in the first method, and every one having another under it, as in the second; and so that, when the tackle is in use, the two tiers that are the remotest from one another, are so much larger in diameter than those that are nearest, as to allow the lines of the former to go over the lines of the latter without rubbing. From this construction arises a new method of reeving the line upon the shieves; for here, whatever be the number of shieves, the fall of the tackle will be always upon the middle shieve, or on that next to the middle, according as the number of pulleys in each pin is odd or even. To do this, the line is fixed to some convenient part of the upper block, and brought round the middle shieve of the larger tier of the under block, from thence round one of the same sort next the centre one of the upper block, and so on, till the line comes to the outside shieve, where the last line of the larger tier falls upon the first shieve of the smaller, and being reeved round those, till it comes at the opposite side, the line from the last shieve of the smaller tier again rises to the first of the larger, whence it is conducted round, till it ends on the middle shieve of the upper block on the larger tier. See *fig.* 13. *Phil. Trans.* vol. *xlvi.* art. 82. p. 494, &c.

As a system of pulleys has no great weight, and lies in a small compass, it is easily carried about, and can be applied, in a great many cases, for raising weights, where other engines cannot be used. But they have a great deal of friction on these accounts; 1. Because the diameters of their axes bear a very considerable proportion to their own diameters; 2. Because in working they are apt to rub against one another, or against the sides of the block; 3. Because of the stiffness of the rope that goes over and under them. *Ferguson's Mechan.* p. 37, 4to. See FRICTION.

PULLICATE, in *Geography*, a town of Hindoostan, on the coast of Coromandel, near a large lake to which it gives name. This lake, called by d'Anville *Ericans*, seems to owe its existence to the same cause as the Chilka

lake; that is, to the sea's breaking through a low sandy beach, and overflowing the lands within; for its communications with the sea are extremely narrow, like the *embouchures* of small rivers. This lake is in extent thirty-three British miles, from N. to S., and eleven over, in the broadest part, and contains some large islands within it: one of these is named *Ircum*, in Mr. Bernard's map of the Jaghire, published by Mr. Dalrymple; and as M. d'Anville names this island, as well as the lake, *Ericans*, Major Rennell concludes it to be a corruption, or misconception, of *Ircum*. In the year 1609 the Dutch established themselves, and built a fort which they called *Geldria*. After the loss of *Negapatam*, the chief government on the coast of *Coromandel* was removed to this town; 22 miles N. of *Madras*. N. lat. $13^{\circ} 24'$. E. long. $80^{\circ} 27'$.

PULLICH, a town of France, in the department of the Rhone and Moselle; 6 miles E. of *Kayserch*.

PULLING, in *Sea Language*, denotes the act of rowing with the oars.

PULLINGI, in *Geography*, a town of Sweden, in West Bothnia, on the *Tornea*; 48 miles N. of *Tornea*.

PULLS, in *Agriculture*, the chaffy pods of rape or cole.

PULLUMNAIRE, in *Geography*, a town of Hindoostan, in the Carnatic; 94 miles W. of *Madras*. N. lat. $13^{\circ} 10'$. E. long. $78^{\circ} 50'$.

PULLUS, or PALLEN, ROBERT, in *Biography*, an English cardinal who flourished in the 12th century, was distinguished as a zealous friend to the interests of literature. He pursued his studies at Paris, and about the year 1130 he returned to England, where he had the mortification of seeing the university of Oxford ravaged and nearly ruined by the ignorant and ferocious Danes, under the reign of Harold I. He was one of those able men, to whose indefatigable exertions this seat of learning was indebted for its revival and restoration. To this object he devoted his advice, his fortune, his personal labours, and his learning. For some years he taught daily in the schools: for this and other eminent services, he was rewarded with the archdeaconry of Rochester. After this he returned to Paris, where he filled the chair of professor of divinity. He was, however, recalled by his metropolitan, and the revenues of his benefice sequestered till he obeyed the summons. The archdeacon appealed to the see of Rome, and sentence was given in his favour. The fame of his learning induced pope Innocent II. to invite him to Rome, where he was received with great marks of honour; and in the year 1144 was created cardinal by Celestine II., and afterwards chancellor of the Roman church, by pope Lucius II. He died in the year 1150. He was author of several works; but the only one of them now extant is his "*Sententiarum Liber*," which was published at Paris in 1655.

PULLYVELLUM, in *Geography*, a town of Hindoostan, in the Carnatic; 8 miles S. of *Terriore*.

PULMANN, THEODORE, in *Biography*, a philologist, born, about 1570, at *Cranenburg*, in the duchy of *Cleves*, was brought up to mechanical pursuits, and for some years exercised the trade of a fuller at *Antwerp*. By hard study in the intervals of his business, he became a proficient in classical literature, and an able grammatical critic. He was employed for sixteen years as a corrector of the press, and gave good editions of several Latin writers, from the press of *Plantin* at *Antwerp*: for which purpose he revised the text by ancient MSS. He died at *Salamanca*. He gave editions of *Virgil*, *Horace*, *Lucan*, *Juvenal*, *Æsop*, *Terence*, *Suetonius*, and several others. *Moreri*.

PULMO, in *Anatomy*. See LUNGS.

PULMO *Marinus*, *Sea-Lungs*, among *Naturalists*, a light spongy

spongy body, of a shining colour, like crystal, intermixed with blue, and usually of a figure resembling the human lungs; whence its name. It is also called *Urtica marina*, (which see) or the sea-nettle.

It swims on the surface of the water, and is popularly reputed to presage a storm. It is commonly supposed to be only a viscous excrement of the sea, hardened by the sun; but Sir Robert Sibbald and Dr. Merret rank it among the zoophytes. It shines in the night time, and communicates its luminous property to a stick rubbed with it. Being applied to the skin, it raises an itching, and takes off the hair.

PULMONALIS, in *Anatomy*, pulmonary, a term applied to the artery, veins, and nerves of the lungs. See **LUNGS**.

PULMONARIA, in *Botany*, so called by ancient writers, because the leaves were thought to resemble the speckled surface of the human lungs. Hence the plant was supposed, by one set of physicians, to possess certain virtues, indicated by that resemblance; which caused it to be used in coughs and phthical complaints. The mucilaginous qualities of the herbs rendered it rather favourable than otherwise, in allaying irritation of the throat.—Linn. Gen. 75. Schreb. 101. Willd. Sp. Pl. v. 1. 768. Mart. Mill. Dict. v. 3. Sm. Fl. Brit. 217. Ait. Hort. Kew. v. 1. 292. Juss. 130. Lamarck Illustr. t. 93.—Class and order, *Pentandria Monogynia*. Nat. Ord. *Asperifoliae*, Linn. *Borragineæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, with five angles, and five teeth, permanent. *Cor.* of one petal, funnel-shaped; tube cylindrical, the length of the calyx; limb cut half way down into five obtuse ascending segments; throat pervious. *Stam.* Filaments five, very short, in the throat; anthers erect, converging. *Pist.* Germens four; style thread-shaped, shorter than the calyx; stigma obtuse, notched. *Peric.* none, the permanent unchanged calyx containing the seeds in its lower part. *Seeds* four, roundish, obtuse.

Ess. Ch. Corolla funnel-shaped, pervious. Calyx with five acute angles and flat sides.

Section 1. *Calyx about the length of the tube of the corolla.*

1. *P. angustifolia*. Narrow-leaved Lungwort. Linn. Sp. Pl. 194. Ait. n. 1. Engl. Bot. t. 1628. Fl. Dan. t. 483. Park. Parad. 251. f. 2. (*P. foliis echii*; Raii Syn. 226. *P. maculosa*; Ger. Em. 808.)—Calyx nearly as long as the tube. Leaves all lanceolate, rough.—Native of woods in Sweden, Siberia, Germany, Switzerland, and England, flowering in May or June. Mr. Turner and Mr. W. Borrer gathered this species wild in a wood between Newport and Ride, in the Isle of Wight, so that all doubts respecting the British plant are removed. (See Fl. Brit. 218, and Engl. Bot. p. 1628.) The root is perennial, tuberous, dark, with thick fibres. Stems a foot high, mostly simple, leafy, round, hairy. Leaves all lanceolate, acute, wavy, rough, slightly if at all spotted; the radical ones four or five inches long, tapering at the base into longish footstalks. Spikes terminal, in pairs, short. Corolla of a deep purplish-blue; red in the bud. Calyx hairy.

2. *P. officinalis*. Common Lungwort. Linn. Sp. Pl. 194. Fl. Brit. n. 1. Engl. Bot. t. 118, excluding the uncoloured leaves, which belong to the first species. Fl. Dan. t. 482. Woody. Suppl. t. 212. (*P. foliis echii*; Ger. Em. 808.)—Calyx nearly as long as the tube. Radical leaves ovate or heart-shaped, rough.—Native of shady places in various parts of Europe; rare in England, except in gardens, where it frequently occurs, flowering in May. This differs from the foregoing chiefly in its much broader, shorter, and more spotted leaves, whose surface is besprinkled

with pale, whitish, round blotches, most remarkable at an early stage of growth.—The flowers are occasionally white in this as well as the *angustifolia*.

Sect. 2. *Calyx but half so long as the tube of the corolla.*

3. *P. suffruticosa*. Shrubby Lungwort. Linn. Sp. Pl. 1667. Willd. n. 3. (*Lithospermum angustifolium umbellatum*; Boec. Sic. 77. t. 41. f. 2. Pluk. Phyt. t. 42. f. 7.)—Leaves linear, rough. Segments of the calyx deep, awl-shaped.—Native of mountains in Italy and Sicily. A species but little known, entirely a stranger to our gardens. Its stem is short, but perennial and rather woody, clothed with the permanent foliage of the last year. Leaves copious, long and narrow. Flowers blue, with more of the character of a *Lithospermum* than of a *Pulmonaria*.

4. *P. paniculata*. Panicked Lungwort. Ait. Hort. Kew. ed. 1. v. 1. 181. ed. 2. v. 1. 293. Willd. n. 4.—Calyx short, hispid, with deep segments. Leaves ovate-oblong, pointed, rather hairy.—Native of Hudson's Bay. Dr. Solander is recorded as its introducer at Kew, in 1778. This is a hardy species, flowering in May and June, of which no figure has appeared, nor have we seen a specimen.

5. *P. virginica*. Virginian Lungwort. Linn. Sp. Pl. 194. Ait. n. 4. Curt. Mag. t. 160. Mill. Ic. t. 212. (*P. foliis ovatis glabris, scapo laxo*; Trew Ehret. 11. t. 42. Symphytum, five *Pulmonaria non maculata, foliis glabris, americana, flore patulo cæruleo*; Pluk. Alm. 359. t. 227. f. 6.)—Calyx short, very smooth. Leaves lanceolate, bluntish.—Native of North America; from Pennsylvania to Carolina according to Mr. Pursh, growing on the gravelly shores of rivers, and flowering from March to May. With us it is a hardy perennial, of great beauty, but not so generally cultivated as it deserves. The whole herb is very glaucous, and so nearly smooth as almost to form an objection to the name of its natural order. The flowers are drooping, of a fine sky blue, and shaped like those of an *Onosma*; their tube and buds purple.

6. *P. sibirica*. Siberian Lungwort. Linn. Sp. Pl. 194. Ait. n. 5. (*Anchusa*; Gmel. Sib. v. 4. 75. n. 15. t. 39.)—Calyx short. Radical leaves heart-shaped.—Native of Siberia, and North America. Nearly akin to the last. Mr. Masson introduced it at Kew, in 1801. It is perennial, flowering in June and July.

7. *P. maritima*. Sea Lungwort. Linn. Sp. Pl. 195. Fl. Brit. n. 2. Engl. Bot. t. 368. Curt. Lond. fasc. 6. t. 18. Fl. Dan. t. 25.—(*Cerithe maritima procumbens, foliis et floribus cæruleis*; Dill. Elth. 75. t. 65.)—Calyx short. Leaves ovate, glaucous. Stem branched, procumbent.—Native of sandy sea-shores in Iceland, Norway, Scotland, and the north of England, flowering in July. This is most akin to the two last, but differs in being smaller, with a procumbent, much branched, and widely spreading stem. The whole herb is very glaucous. Leaves ovate, tapering at the base, rough with minute scattered tubercles. When chewed, in a recent state, their flavour is somewhat like a raw oyster; but by no means the more pleasant on that account, even to oyster-eaters. The flowers are racemose, terminal, of a very beautiful purplish-blue, pink in the bud. This is one of the most strikingly elegant of our native plants, at least in its native situations. The late Mr. John Mackay observed a variety, whose herbage was entirely green, not glaucous.

PULMONARIA, in *Gardening*, furnishes plants of the hardy, perennial, fibrous-rooted kind, of which the species cultivated are the common lungwort (*P. officinalis*); the narrow-leaved lungwort (*P. angustifolia*); and the Virginian lungwort (*P. virginica*).

The second species varies with white flowers.

Method of Culture.—These plants are increased by seeds, and parting the roots.

The seeds should be sown in the spring, in a bed or border of common earth, raking them in. They soon come up; and the latter end of summer they should be put out, either where they are to remain, or in nursery-beds, till October, when they should be planted out finally.

The roots should be parted in the autumn, as about August or September; but the sooner after they have done flowering, the better. They should not be divided too small, and be planted directly; when they flower strong in the following spring. They afford ornament in shady situations.

PULMONARY CONSUMPTION, in *Medicine*, *Phtthisis pulmonaris*, or consumption of the lungs. See CONSUMPTION.

PULMONES, in *Anatomy*. See LUNGS.

PULMONES *Marinae*. See PULMO, and URTICA *Marina*.

PULMONIC MACHINE, is a machine contrived for drawing fresh air, or medicated steams, into the lungs or throat, &c. Some have recommended for this purpose an inverted funnel: others have contrived machines for infusing herbs, &c. and annexed to them tubes for inspiring the steam or volatile parts thus obtained for them. A machine of this kind was contrived some years ago by Mr. Arden of Derby, which is described in the Gentleman's Magazine for 1748, vol. xviii. p. 486. A machine of this kind was contrived by Dr. Hales, for meliorating the air passing through the lungs of miners, &c. and is described in his "Vegetable Statics," vol. i. p. 264, &c. An instrument designed for similar purposes, and called an inhaler, was lately invented by Mr. Mudge. See INHALER.

PULMONUM ANIMA. See ANIMA.

PULO AKAT, in *Geography*, a small island in the East Indian sea, near the N.E. coast of Ceram. S. lat. $3^{\circ} 6'$. E. long. $131^{\circ} 3'$.—P. *Ampal*, a small island in the East Indian sea, on the W. coast of Sumatra. S. lat. $0^{\circ} 44'$. E. long. $99^{\circ} 29'$.—P. *Anam*, a small island in the East Indian sea, near the W. coast of Sumatra. S. lat. $0^{\circ} 40'$. E. long. $99^{\circ} 27'$.—P. *Anna*, a small island in the Pacific ocean, seen by captain Carteret in 1767, who called it Current island. N. lat. $4^{\circ} 38'$. E. long. $131^{\circ} 46'$.—P. *Aru*, a small island in the straits of Malacca. N. lat. $2^{\circ} 57'$. E. long. $100^{\circ} 24'$.—P. *Auro*, a small island in the Chinese sea, near the E. coast of Malacca. N. lat. $2^{\circ} 30'$. E. long. $104^{\circ} 40'$.—P. *Ayer*, a small island near the W. coast of Sumatra. S. lat. $1^{\circ} 11'$. E. long. $100^{\circ} 12'$.—P. *Babee*, a small island near the W. coast of Sumatra. S. lat. $5^{\circ} 45'$. E. long. $100^{\circ} 3'$.—P. *Alfo*, a small island in the straits of Sunda. S. lat. $5^{\circ} 45'$. E. long. $106^{\circ} 10'$.—P. *Baby*, a small island in the East Indian sea, near the N. coast of the island of Nyas. N. lat. $1^{\circ} 27'$. E. long. 97° .—P. *Batoa*, an island in the East Indian sea, near the W. coast of Sumatra, about 40 miles in circumference. N. lat. $0^{\circ} 20'$. E. long. $98^{\circ} 5'$.—P. *Bava*, a small island in the East Indian sea, near the S. coast of Nyas. N. lat. $0^{\circ} 52'$. E. long. $97^{\circ} 18'$.—P. *Bin-tango*, a small island near the W. coast of Sumatra. S. lat. $0^{\circ} 58'$. E. long. $99^{\circ} 47'$.—P. *Brasse*, an island in the East Indian sea, of a triangular form, about 20 miles in circumference, near the N. coast of Sumatra. N. lat. $5^{\circ} 24'$. E. long. $95^{\circ} 18'$.—P. *Brata*, a small island near the E. coast of Malacca. N. lat. $4^{\circ} 55'$. E. long. $103^{\circ} 40'$.—P. *Bringen*, a small island near the W. coast of Sumatra. S. lat. $1^{\circ} 58'$. E. long. $100^{\circ} 21'$.—P. *Canton*, or *Pulo Ratan*, an island in the Chinese sea, near the coast of Cochinchina. At some distance it bears the resemblance of two islands, being high at both extremes, and low in the middle. N. lat. $15^{\circ} 10'$.

E. long. $109^{\circ} 35'$.—P. *Capas*, a small island near the E. coast of Malacca. N. lat. $5^{\circ} 18'$. E. long. $103^{\circ} 20'$.—P. *Casse*, a small island near the W. coast of Sumatra. S. lat. $0^{\circ} 20'$. E. long. $99^{\circ} 28'$.—P. *Cava*, a small lofty island in the gulf of Siam, near the W. coast. N. lat. $8^{\circ} 28'$. E. long. $101^{\circ} 20'$.—P. *Condore*. See CONDORE.—P. *Dammer*, an island in the East Indian sea, about 20 miles in circumference, near the S. coast of Gilolo. S. lat. $0^{\circ} 58'$. E. long. $128^{\circ} 22'$.—P. *Datte*, a small island in the East Indian sea, near the W. coast of Borneo. N. lat. $0^{\circ} 8'$. E. long. $108^{\circ} 59'$.—P. *Ding-Ding*, a small island on the coast of Malacca, at the mouth of the river Pera.—P. *Doa*, a small island near the W. coast of Sumatra. N. lat. $1^{\circ} 18'$. E. long. $97^{\circ} 33'$.—P. *Docan*, a small island in the East Indian sea. S. lat. $1^{\circ} 2'$. E. long. $105^{\circ} 39'$.—P. *Dua*, a small island near the W. coast of Sumatra. N. lat. $2^{\circ} 46'$. E. long. 97° .—P. *Een*, a small island in the Pacific ocean, near the N.W. coast of the island of Waygoo. N. lat. $0^{\circ} 12'$. E. long. $130^{\circ} 37'$.—P. *Ely*, a small island near the W. coast of Sumatra. N. lat. $1^{\circ} 6'$. E. long. $98^{\circ} 11'$.—P. *Gasseb*, a small island in the East Indian sea, near the S.E. coast of the island of Ceram. S. lat. $3^{\circ} 29'$. E. long. $131^{\circ} 13'$.—P. *Gasses*, a small island in the East Indian sea, near the E. coast of the island of Oby. S. lat. $1^{\circ} 37'$. E. long. $128^{\circ} 20'$.—P. *Goere*, a small island in the East Indian sea, near the N. coast of Sumatra. N. lat. $4^{\circ} 42'$. E. long. $97^{\circ} 42'$.—P. *Gontei*, a small island in the East Indian sea, near the coast of Sumatra. N. lat. $5^{\circ} 15'$. E. long. $95^{\circ} 23'$.—P. *Gunton*, a small island in the straits of Malacca. N. lat. $1^{\circ} 22'$. E. long. $101^{\circ} 38'$.—P. *Lalang*, an island in the straits of Malacca, about 50 miles in circumference. N. lat. $2^{\circ} 25'$. E. long. $100^{\circ} 9'$.—P. *Laut*, an island in the East Indian sea, at the S. entrance of the straits of Macassar, near the S.E. coast of the island of Borneo, of a triangular form, about 100 miles in circumference, producing chiefly rice, and thinly inhabited. The channel between the island of Pulo Laut and Borneo is about two miles broad, and from seven to eight fathom deep. It affords a good harbour for shipping. S. lat. $3^{\circ} 45'$. E. long. $116^{\circ} 24'$.—P. *Laut, Little*, a group of small islands in the East Indian sea; 18 miles S. of Pulo Laut. S. lat. $4^{\circ} 54'$. E. long. $115^{\circ} 55'$.—P. *Lawn*, a small island in the East Indian sea. S. lat. $1^{\circ} 33'$. E. long. $128^{\circ} 48'$.—P. *Leat*, a small island in the East Indian sea. S. lat. $2^{\circ} 51'$. E. long. $107^{\circ} 5'$.—P. *Majo*, a small island in the East Indian sea, near the N. coast of Cumbava. S. lat. $8^{\circ} 11'$. E. long. $117^{\circ} 20'$.—P. *Malora*, a small island near the N. coast of Sumatra. N. lat. $5^{\circ} 24'$. E. long. $95^{\circ} 39'$.—P. *Mariore*, a small island in the Pacific ocean. N. lat. $4^{\circ} 17'$. E. long. $131^{\circ} 57'$.—P. *Marra*, a small island near the W. coast of Sumatra. S. lat. $1^{\circ} 22'$. E. long. $99^{\circ} 48'$.—P. *Mintaon*, an island in the East Indian sea, about 40 miles long and 12 broad, nearly on the equinoctial line; about 40 miles from the W. coast of Sumatra. E. long. $97^{\circ} 50'$.—P. *Moar*, a small island in the East Indian sea, near the E. coast of Gilolo. N. lat. $0^{\circ} 6'$. E. long. $128^{\circ} 58'$.—P. *Nancy*, an island near the N. coast of Sumatra, of a triangular form, about 20 miles in circumference. N. lat. $5^{\circ} 18'$. E. long. $95^{\circ} 21'$.—P. *Niamo*, or *Ausquitto*, a small island near the W. coast of Sumatra. S. lat. $1^{\circ} 8'$. E. long. $99^{\circ} 45'$.—P. *Nye*, a small island in the East Indian sea, near the W. coast of the island of Poggy. S. lat. $2^{\circ} 48'$. E. long. $99^{\circ} 32'$.—P. *Padum*, an island in the straits of Malacca, of a triangular form, and about 30 miles in circumference. N. lat. $1^{\circ} 21'$. E. long. $101^{\circ} 58'$.—P. *Pabang*, a small island near the coast of Malacca; about five miles from the town of Pahang.—P. *Panca*, a small island near the W. coast of Sumatra. N.

lat. $0^{\circ} 18'$. E. long. $98^{\circ} 35'$.—P. *Pandan*, a small island in the straits of Malacca, near the N. coast of the island of Sumatra. N. lat. $3^{\circ} 30'$. E. long. $98^{\circ} 57'$.—P. *Panjang*, a small island in the East Indian sea, near the E. coast of the island of Bintang. S. lat. $1^{\circ} 3'$. E. long. $104^{\circ} 55'$.—P. *Panjoor*, an island in the straits of Malacca, near the coast of Sumatra, about 150 miles in circumference. N. lat. $1^{\circ} 6'$. E. long. $102^{\circ} 28'$.—P. *Pec*, a small island in the straits of Malacca; about 5 miles W. from the city of Malacca. N. lat. $2^{\circ} 12'$. E. long. $102^{\circ} 6'$.—P. *Penneu*, or *Orange island*, a small island near the W. coast of Sumatra. S. lat. $1^{\circ} 28'$. E. long. $100^{\circ} 2'$.—P. *Pinang*. See PRINCE OF WALES'S ISLAND.—P. *Pifang*, a small island in the East Indian sea, near the W. coast of Sumatra, where the Dutch keep a quarter-master and some slaves. On the E. side of the island is a stone wharf. S. lat. $5^{\circ} 10'$. E. long. $105^{\circ} 33'$.—Also, a small island in the East Indian sea. S. lat. $1^{\circ} 25'$. E. long. $128^{\circ} 58'$.—Also, a small island near the E. coast of Malacca. N. lat. $2^{\circ} 40'$. E. long. $104^{\circ} 32'$.—P. *Poggy*. See POGGY.—P. *Prompton*, one of the Banda islands. S. lat. $4^{\circ} 2'$. E. long. $130^{\circ} 38'$.—P. *Rhun*. See POOLARON.—P. *Rocket*, a small island near the N. coast of Java. S. lat. $5^{\circ} 57'$. E. long. $108^{\circ} 17'$.—P. *Ron*, a small island in the East Indian sea, near the S.E. coast of Gilolo. S. lat. $0^{\circ} 48'$. E. long. $128^{\circ} 30'$.—P. *Rondo*, a cluster of small islands in the East Indian sea, N. of Sumatra. N. lat. $5^{\circ} 45'$. E. long. $95^{\circ} 22'$.—P. *Roopat*, an island in the straits of Malacca, about 120 miles in circumference, separated by a narrow channel from the island of Sumatra. N. lat. $1^{\circ} 58'$. E. long. $101^{\circ} 9'$.—P. *Rou*, a small island near the coast of Malacca. N. lat. 7° . E. long. $102^{\circ} 12'$.—P. *Sabadda*, a small island near the W. coast of Sumatra.—P. *Sabuda*, a small island in the East Indian sea; about 30 miles W. from New Guinea. S. lat. $2^{\circ} 35'$. E. long. $131^{\circ} 48'$.—P. *Salanama*, a small island in the straits of Malacca, near the N. coast of the island of Sumatra. N. lat. $3^{\circ} 27'$. E. long. $98^{\circ} 51'$.—P. *Salier*, a small island in the East Indian sea. S. lat. $5^{\circ} 50'$. E. long. $105^{\circ} 56'$.—P. *Sambolong*, i. e. *Nine Islands*, a cluster of islands in the East Indian sea, at the entrance of the river Pera, on the coast of Malacca.—P. *See Booro*, a small island in the East Indian sea, near the N. coast of the island of Pera. S. lat. $1^{\circ} 52'$. E. long. $99^{\circ} 9'$.—P. *See Geere*, a small island in the East Indian sea, near the N. coast of the island of Pera. S. lat. $1^{\circ} 55'$. E. long. $99^{\circ} 10'$.—P. *Selan*. See PRINCE'S ISLAND.—P. *Seyer*, a cluster of islands in the East Indian sea. N. lat. $8^{\circ} 40'$. E. long. $97^{\circ} 15'$.—P. *Sonaro*, a small island near the W. coast of Sumatra. S. lat. $0^{\circ} 53'$. E. long. $99^{\circ} 42'$.—P. *Suarjee*, one of the Banda islands. S. lat. $4^{\circ} 6'$. E. long. $130^{\circ} 20'$.—P. *Tamong*, a small island near the W. coast of Sumatra. N. lat. $0^{\circ} 27'$. E. long. $98^{\circ} 24'$.—P. *Taya*, a small island in the East Indian sea. S. lat. $0^{\circ} 42'$. E. long. $104^{\circ} 57'$.—P. *Teega*, a small island near the W. coast of Sumatra. S. lat. $0^{\circ} 52'$. E. long. $99^{\circ} 40'$.—P. *Tellore*, a small island near the W. coast of Sumatra. S. lat. $1^{\circ} 42'$. E. long. $100^{\circ} 15'$.—P. *Timoan*, an island in the East Indian sea, inhabited by Malays, found to be surly and insolent by commodore Byron, who touched at the island in 1765. The commodore, notwithstanding their hostile appearance, armed with a long knife in one hand, an iron-headed spear in the other, and a dagger by their side, went on shore, and commencing a treaty with them, could merely obtain about twelve fowls, and a goat and kid. His offers of knives, hatchets, bill-hooks, and similar articles, were contemptuously rejected, and they demanded rupees; but the commodore having none, tendered for payment of what he had purchased, pocket-handkerchiefs, which they condescended to accept,

selecting the best of them. The stature of these people was small; but they were well made, and of a dark copper colour. The island is mountainous and woody: its productions are rice, and the cabbage and cocoa-nut tree, in great abundance. N. lat. 3° . E. long. $104^{\circ} 25'$.—P. *Timpalis*, a small island in the straits of Malacca, near the N.E. coast of Sumatra. N. lat. $4^{\circ} 27'$. E. long. $97^{\circ} 45'$.—P. *Toobooyan*, a small island in Keyser's bay, on the S. coast of Sumatra. S. lat. $5^{\circ} 46'$. E. long. $104^{\circ} 42'$.—P. *Toty*, a small island in the East Indian sea. S. lat. $0^{\circ} 58'$. E. long. $105^{\circ} 50'$.—P. *Troofan*, a small island near the W. coast of Sumatra. S. lat. $1^{\circ} 6'$. E. long. $99^{\circ} 58'$.—P. *Tullong*, a small island in the straits of Malacca. N. lat. $4^{\circ} 27'$. E. long. $100^{\circ} 33'$.—P. *Varella*, a small island in the straits of Malacca, near the N.E. coast of Sumatra. N. lat. $3^{\circ} 51'$. E. long. $98^{\circ} 42'$.—P. *Ubi*, a small island in the Chinese sea, near the N.W. coast of Cambodia. N. lat. $8^{\circ} 33'$. E. long. $104^{\circ} 10'$.—P. *Ubi, False*, a small island in the Chinese sea, near the coast of Cambodia. N. lat. $8^{\circ} 52'$. E. long. $103^{\circ} 53'$.—P. *Way*, a small island in the gulf of Siam, near the gulf of Cambodia. N. lat. $10^{\circ} 8'$. E. long. 103° .—Also, an island about 30 miles in circumference, near the N. coast of Sumatra; 27 miles N. of Acheen. N. lat. $5^{\circ} 33'$. E. long. $95^{\circ} 33'$.—Also, one of the Spice islands, in the East Indian ocean. S. lat. $4^{\circ} 9'$. E. long. $130^{\circ} 26'$.

PULP, PULPA, in fruits, the *flesh*; or that soft and succulent part between the rind and the nucleus or seed.

The pulp of a tree or plant is the parenchyma, which grows and swells by means of a juice, at first very coarse and disagreeable; at length sweeter, and more delicate.

PULP, in *Pharmacy*, denotes the soft part of fruits, roots, or other bodies, extracted by infusion or boiling, and passed through a sieve.

PULP, in *Physiology*, denotes the fattest, fullest, and most solid part of the flesh.

Some people apply the word particularly to the upper part of the belly, because fleshy; and because it is here that they feel animals, to examine whether they be fat. This part the Latins call *pulpa*, from *pulpare*, *to feel, handle*.

PULPIT, PULPITUM, a term now restrained to an elevation, or apartment in a church, whence sermons are delivered.

Some authors derive the word from *publicum*, because people are there exposed to open view.

To the observations on pulpit eloquence, which the reader will find under ELOCUTION *of the Pulpit*, and under other heads to which we shall refer at the close of this article, we shall here introduce some reflections that may not be thought unappropriate to the subject, nor altogether uninteresting and uninteresting.

Pulpit eloquence has its advantages and also its disadvantages. It derives advantages from the dignity and importance of its subjects, which, duly considered, must be acknowledged superior to every other. They are in themselves highly interesting, as addressed both to the understanding and the heart; and they admit, at the same time, both the highest embellishment in describing, and the greatest vehemence and warmth in enforcing them. A preacher likewise, in treating these subjects, has often the advantage of addressing a large assembly, of proceeding without interruption, and of being under no necessity of making any extemporaneous replies. He may also previously chuse the theme of his discourse, and make every kind of necessary preparation. To counterbalance these advantages, the pulpit orator, though he has no adversary with whom he is called upon to contend, is not raised and enlivened by debate: and though he chuses his subjects, which are in themselves important and interesting, they are trite and familiar;

miliar; they have often been discussed by others; they have frequently recurred to himself in the exercise of his office; and they do not admit of much novelty and variety in the mode of treating them. It should also be considered, that the preacher is very much restricted to abstract qualities, such as virtues and vices; whereas other popular speakers present persons as well as characters to the view of their hearers, and hence derive peculiar advantage for interesting their attention. Accordingly Bruyere, in his "Mœurs de Siècle," closes his comparison of the eloquence of the pulpit with that of the bar by observing, "that it is more easy to preach than to plead; but that it is more difficult to preach well than to plead well." Nevertheless, though the art of preaching well is of difficult and rare attainment, Dr. Campbell (Rhetoric, b. i. c. 10.) candidly remarks, that considering how rare the talent of eloquence is among men, and considering all the disadvantages under which preachers labour, particularly from the frequency of this exercise, joined with the other duties of their office, to which fixed pastors are obliged, there is more reason to wonder that we have so many instructive and even eloquent sermons, than that we hear so few. Some indeed have unjustly argued, that preaching is no proper subject of the art of eloquence. But true eloquence, which is the art of placing truth in the most advantageous point of view for conviction and persuasion, cannot in any department of oratory be more suitably employed. A regard to this object is most intimately connected with the successful execution of the preacher's office; and if any further reasoning were necessary in so plain a case, we might refer to the discourses of the prophets and apostles, as models of the most sublime and persuasive eloquence, adapted both to the imagination and passions of men. "With regard to the pulpit," says Dr. Blair (Lect. vol. ii.), "it certainly has been a great disadvantage, that the practice of reading sermons, instead of repeating them from memory, has prevailed in England. This may, indeed, have introduced accuracy, but it has done great prejudice to eloquence; for a discourse read is far inferior to an oration spoken. It leads to a different sort of composition, as well as of delivery; and can never have an equal effect upon any audience." We much doubt, however, whether compositions, delivered from memory, are likely to be more truly eloquent and more impressive on the auditors, than those that are properly read. Perhaps the most advantageous mode of preaching, with regard to present effect, though very few excel in it, is that which is wholly extemporaneous: the preacher having previously formed the general plan of his discourse, and trusting for enlargement, on mere hints committed to paper, to the invention of the moment. But this is a mode of preaching which one could hardly venture to recommend to young divines, lest by acquiring an habitual self-command and a facility of *off-hand* speaking, they neglect to furnish themselves with ample materials for judiciously varied discourses. A few subjects, recurred to again and again, have usually formed the whole stock of popular extemporary preachers.

"Another circumstance," Dr. Blair observes, "has been unfortunate. The sectaries and fanatics, before the Restoration, adopted a warm, zealous, and popular manner of preaching, and those who adhered to them in after-times, continued to distinguish themselves by somewhat of the same manner. The odium of these sects drove the established church from that warmth which they were judged to have carried too far, into the opposite extreme of a studied coolness and composure of manner. Hence, from the art of persuasion, which preaching ought always to be, it has

passed in England, into mere reasoning and instruction; which not only has brought down the eloquence of the pulpit to a lower tone than it might justly assume; but has produced this farther effect, that, by accustoming the public ear to such cool and dispassionate discourses, it has tended to fashion other kinds of public speaking upon the same model." See ELOCUTION, ELOQUENCE, ORATION, PREACHING, *Public SERMON*, and *Public SPEAKING*.

PULPITUM, among the Romans, was a part of the theatre, called also *proscenium*, or what we now call the *stage*, on which the actors trod. Though some say it was properly an eminence on the stage for the music, or a *gestum* whence declamations, &c. were spoken.

The French use the word pulpit, *pupitre*, for a reading-desk in a church, library, or the like: those large ones in churches they properly called *lutrins*.

PULSATILLA, in *Botany*, from *pulsare*, to beat; because its flowers, in their open elevated native stations, are beaten about by the wind. Hence the name of Wind-flower. See ANEMONE.

PULSATION, PULSATIO, in *Medicine*, the motion of the pulse, or the beating of an artery. See PULSE.

PULSATOR, a name given by some writers to that species of beetle commonly known among us by the name of the death-watch, and about which so many superstitious fancies prevail.

PULSE, in *Anatomy*, the beating of the arteries, perceptible to the touch, and eye, produced by the influx of a fresh quantity of blood from the heart. See HEART, and CIRCULATION.

PULSE, in *Medicine*. As the pulse is well known to consist of the successive dilatations and contractions of the arteries, in consequence of the successive impulses given to the blood through them by the repeated contractions of the heart, and by their own muscular and elastic powers, it might be supposed, that this phenomenon would excite little attention among pathologists, prior to the discovery of the circulation of the blood. This supposition, however, would be the very reverse of truth; for, in fact, the variations of the pulse, as an index both of health and disease, have been attended to from the earliest ages of medicine, being frequently mentioned by Hippocrates, and described at great length by Galen and Cælius Aurelianus. Celsus has likewise noticed the pulse, as an indication of disease, adding, with his usual sagacity, that it is a very uncertain guide, "*fallacissima res*," and stating some rational rules for the mode of investigating its actual condition. In truth, though the cultivation of anatomy has enabled us to explain the nature of the pulse, and of some other functions of the living body, yet it has scarcely opened any new source of knowledge respecting the *prognosis* to be derived from the pulse in particular diseases; a knowledge which is the result of observation alone, or of a comparison of different cases of disease, in which the pulse is variously modified, and which, therefore, like many other doctrines in medical science, was equally open to the ancients, though ignorant of anatomy, and successfully cultivated by some of them. The ingenuity and imagination of Galen led him, indeed, to make a great many subtle distinctions respecting the varieties of the pulse, which were echoed by medical writers even down to the last century, but which are now pretty generally exploded as frivolous and impracticable; it would, therefore, be superfluous to enter into a minute detail on the subject. On the other hand, however, we are not disposed to agree with Dr. Falconer, in commending the opposite extreme, into which we conceive a very able and estimable physician of our own country has fallen, of reducing

all the cognizable variations of the pulse to two, *viz.* *quick* and *slow*. (See Dr. Heberden's excellent paper, entitled "Remarks on the Pulse," in the second volume of the Medical Transactions of the College of Physicians; and Dr. Falconer's "Observations on the Pulse," Lond. 1796.) For in the first place, the uncertainty of the healthy standard in individuals, which induced Dr. Falconer to take the trouble of calculating a long series of tables of comparative rates in different persons, necessarily renders the celerity of the pulse a point of considerable uncertainty; not to mention the numerous sources of variety in this respect, from age, strength, time of day, &c. which we shall presently describe; and in the second place, we think, every attentive practitioner, with a very moderate tact, is able to distinguish several other varieties, which occasionally direct his decision as to the mode of practice which he pursues. The distinctions, for instance, of strong and weak, full and small, hard and soft, equal and unequal, regular and irregular or intermittent, are surely very perceptible in many cases of disease; and not unfrequently serve to modify both the diagnosis and the prognosis, as well as the direction of remedies. The degree of *celerity* of the pulse is, however, the most obvious quality, and is capable of being measured without any of the tact of experience; and it is moreover the most variable quality under every variation of the condition of the body; it becomes, therefore, the principal object of our consideration.

It is not above a century since the pulse was first counted, or a standard of its natural frequency was attempted to be accurately established. Sir John Floyer appears to have been the first who applied a portable instrument to the purpose, beginning with a minute-glass, (see his work entitled "The Physician's Pulse Watch," 1707,) and it was only during the present age that the general introduction of such instruments among professional men took place. With respect to the natural standard, to which the comparative terms *quick* and *slow* must be referred, there has indeed been considerable difference in the statements of different physicians. This standard has been attempted to be inferred from the examination of the pulse in a number of persons in health, by taking the mean of the numbers collectively. The natural pulse of individuals varies considerably, however, from so many circumstances, that there is some difficulty in adjusting this standard. These circumstances have been methodically detailed by Dr. Falconer, and require to be taken into the consideration of all, who would properly estimate the signs and indications afforded by the pulse: they are as follows.

First, such circumstances as arise from *bodily organization*; and these are, 1. That of *sex*. The average number of the pulsations in an adult man, in good health, between 30 and 40 years of age, is estimated at about 73 in a minute; but the pulse of women of the same age and condition is somewhat quicker. Kepler, who estimated the mean pulses of men at 70 in a minute, estimated those of women at 80, or at one-seventh more; and Dr. Falconer considers the difference to be in about the same proportion, calculating the ordinary pulse of men at 75, and that of women at 84. 2. The *temperament*. The same causes which produce a quicker pulse in women than in men, probably operate in different temperaments; for those persons, who bear marks of the sanguine habit (which approximates to the female constitution), namely, who have a fair and florid complexion, light-coloured and soft hair, blue eyes, soft and succulent flesh, with considerable sensibility of mind and disposition, have generally a quicker pulse than persons with dark hair and eyes, pale or fallow complexion, firmness of the mus-

cular parts, and, in the mental qualifications, resolution, and steadiness of temper. 3. The *stature*. It may be questioned whether the difference of stature occasions so much difference in the velocity of the pulse, as the mechanical physicians maintained, though it probably has some influence. Dr. Bryan Robinson has given a table of pulses, according to stature, taking six feet as the standard, at which height he found the pulse to be 65, and computing upon this rule, which he says was founded upon a great number of observations, that the mean pulses of well-proportioned bodies were to one another, inversely, as the biquadrate roots of the cubes of the lengths of the bodies. Senac held a similar opinion, but his computation was somewhat different. He states the following proportion; namely, at 2 feet, pulse 90; at 4 feet, pulse 80; at 5 feet, pulse 70; and at 6 feet, pulse 60; the last number of which he says was deduced from observation of one hundred men of the royal guards, who were selected for that office on account of their tallness of stature. Haller, however, pays little regard to this opinion, and brings as instances the Swiss people, who are in general tall of stature, and their pulses more numerous than this standard. He himself, he tells us, was six feet high, and his own pulse beat 78 in a minute.

Secondly, the pulse is varied by the *period of life*. The variations of the pulse during the progress of life have been minutely investigated by the late Dr. Heberden, who has stated the following inferences. "The pulse of a healthy infant asleep on the day of its birth is between 130 and 140 in one minute; and the mean rate for the first month is 120; for during this time the artery often beats as frequently as it does the first day, and I have never found it beat slower than 108. During the first year the limits may be fixed at 108 and 120. For the second year at 90 and 100. For the third year at 80 and 108. The same will very nearly serve for the fourth, fifth, and sixth years. In the seventh year, the pulsations will be sometimes so few as 72, though generally more." From the twelfth year, then, except that the pulsations are much more easily quickened by illness or any other cause, they differ but little from those of a healthy adult, the range of which Dr. Heberden states to be from a little below 60 to a little above 80 in a minute. From an average of five and twenty boys, observed by Floyer, between the ages of twelve and sixteen, the pulse was about 83; in all of them above 80. In stating the average of the pulse of adults, most authors have taken a less extensive range than Dr. Heberden. Sir John Floyer, who employed considerable industry in the investigation of this matter, found the average of eight healthy persons, from twenty to forty years of age, to be somewhat more than 73 in a minute; and he observes, (Physician's Pulse-Watch, p. 40, and 74), "the most natural pulse will have from 70 to 75 beats in a minute in perfect health." Senac also estimates it at the same rate exactly (see his *Traité du Cœur*); and Dr. Bryan Robinson found, after an accurate examination of two healthy persons for many weeks together, and at no less than sixteen intervals, of an hour each, daily, that the average number of the pulse of one of them was 73, and of the other $74\frac{1}{2}$ in a minute. Dr. Falconer, after comparing all the authorities with his own observations, is inclined to consider 75 as the average of an adult healthy pulse. It is not satisfactorily ascertained, whether any material alteration is produced in the pulse by advanced age. Haller thinks that the pulse in old persons is slower than in the middle age; but Dr. Falconer points out some strange mistakes which he has committed, in quoting his authorities. Floyer has given a list of thirteen old persons, in whom the pulse on an average was exactly 76 in a minute.

Dr. Fal-

Dr. Falconer is disposed to believe, though not very confident in his opinion, "that the pulse in a healthy person becomes gradually slower from about forty-five years of age to about sixty, after which period it begins again to grow quicker, and to become, as several other circumstances in the system do also, more resembling that of children. But to this," he adds, "there are undoubtedly many exceptions." P. 23.

Thirdly, the pulse is varied by the *time of day*. The variation of the pulse at different times of the day, even in perfect health, is well known. Whether this variation be the effect of the excitement, produced by the food and drink, exercise, and employment of mind, in the course of the day, or from whatever causes it may arise, it is generally observable, that the pulse is slower in the morning, and somewhat accelerated in the afternoon and evening. This change is particularly obvious in persons of feeble habit and delicate health, in whom a slight tendency even to feverishness is often present in the afternoon; and, in febrile complaints, notwithstanding the utmost care is taken to prevent the access of every irritating cause, the acceleration of the pulse is very commonly aggravated in the evening. Sir John Floyer observed, that his own pulse in the morning falling beat 76 times in a minute, a little before dinner 77, and after dinner 95 times. Senac, in his *Traité du Cœur*, has left a few observations on the same subject; according to him, the pulse which was 62 in the morning, rose to 86 after dinner. Haller also found, that the pulse, which in the morning beat 75, in the evening, towards the time of rest, beat 82. (*Opera Minora*, vol. i. p. 186.) Dr. Bryan Robinson, after stating some very accurate observations on this subject, drew this inference, "that the pulse is slower in the morning than at any other time of the day; that it grows somewhat quicker before breakfast, and a little more so after it; that it grows slower again before dinner, and quicker immediately after dinner, and that the quickness acquired by this meal continues for about three or four hours, and then abates a little, and continues in that state without any considerable change, in bodies which eat and drink little at night, till they go to rest." Robinson's *Animal Economy*, p. 148.

Fourthly. This, however, leads us to the consideration of the effects of *food* and *abstinence* on the pulse, to which the variations at different times of the day may perhaps be partly attributed. It is universally acknowledged, indeed, that taking food accelerates the pulse, while fasting retards it; and many facts in proof of this are recorded by Floyer, Robinson, Haller, and others; but the degree of acceleration produced, is very different in different individuals, being the greatest in persons of delicate and irritable habits.

Fifthly. The pulse is varied by the state of the system, with respect to *rest* or *activity*. Observations have been sufficiently numerous to prove, that during *sleep* the pulse is usually slower than when a person is awake, as might indeed have been anticipated from the consideration, that various causes of excitement, both mental and corporeal, cease to operate during that condition. Dr. Falconer says, "I have repeatedly found the pulse at first waking, not to exceed 61, 62, or 63 beats in a minute, which in a short time, without any alteration of posture, rose to 66, 67, or 68." This slowness, however, will not be observed, if a person has taken plentifully of food or stimulating liquor, a little time before going to sleep, or if he sleeps in a close and hot room, or under a great load of bed-clothes; but it will invariably occur, if the stomach is not loaded, the air pure and cool, and the bed-clothes not more than sufficient to preserve a comfortable warmth.

Motion and *exertion* of every kind is found to quicken the pulse; even the little effort that is made to preserve the body in a standing posture is sufficient to produce a very perceptible increase of the pulse above what it was in a sitting or recumbent posture. Dr. Bryan Robinson has given a proportion of relative increase upon change of position and motion, as follows: lying down, pulse 64, sitting 68, standing 78, walking at the rate of two miles an hour 78, at the rate of four miles an hour 100, running raised it to 140, 150, or more. Speaking is a kind of exercise which has a considerable effect upon the pulse. Every physician must have observed the pulse quickened during his examination of it several beats in a minute by a few words spoken at that time, more especially in a febrile state; hence they generally recommend silence to their patients during such examination.

Mental agitation of every kind appears to accelerate the pulse, but with this difference, according to the observations of Dr. Falconer, that the depressing passions, as fear, anxiety, and grief, tend at the same time to render it weaker, while the stimulating passions, as joy and anger, make it more full and strong. Floyer mentions an instance of the pulse being excited to 104 beats in a minute by anger, and that it did not return to the natural standard in three or four days.

Lastly. The pulse is varied with the *temperature* of the body. The application of heat, exceeding the natural temperature of the body, accelerates the pulse. A very hot room, or sitting near a fire, will increase the number of its beats. In physiological experiments, indeed, it has been ascertained that the application of heat will renew the motion of the heart (or *punctum saliens*) in an egg, after it had ceased for a considerable time. On the other hand, the gradual influence of cold air upon a body that has been over-heated diminishes the number of the pulse. The sudden shock of the cold bath, indeed, quickens the pulse considerably; but in this case the *sensation* becomes a stimulus to the system, and excites both quickness of pulse and an actual glow or evolution of heat. Sir John Floyer has given a table of the pulses of men in different latitudes, making them 120 in a minute under the equator, and 30 at the north pole; but the data upon which this table is formed appear to be questionable. See his *Physician's Pulse-Watch*, vol. i. p. 298.

Before we could derive any information from the pulse, relative to the degrees and nature of diseases, it was absolutely necessary to be acquainted with the foregoing observations in respect to the common standard, and the common causes of variation in health; otherwise we should be liable to many errors in investigating the state of the pulse. Against these ordinary causes of the fluctuation of the pulse, indeed, the physician must be always upon his guard even in disease. The advice of Celsus upon this subject must be followed as long as the pulse is an object of medical attention. After enumerating many causes of its variation, he mentions apprehension, anxiety, and other mental emotions. Therefore, he says, "when the physician first enters the room, if he be a skilful man, he will not immediately apply his fingers to the patient's wrist, but he will first sit down with a cheerful countenance, and make some general inquiries; and if he observes any alarm in the patient, will relieve him by encouraging remarks, and then will proceed to examine the pulse. Now if the sight of the physician is sufficient to quicken the pulse, how easily may a thousand other circumstances disturb it!" (Celsus, de *Medicinâ*, lib. iii. cap. 6.) In feeling the pulse, the two principal qualities to be ascertained are the *quickness* or *frequency* (which we deem synonymous), and the *strength* of the pulsations.

tions. The former, of course, is easily determined by a stop-watch; but the latter requires somewhat of tact and experience; for the degree of strength in the pulse is very different in individuals of different sex, temperament, and vigour, in health. In order to ascertain the force of arterial pulsation, the vessel should first be pressed gently; and, if any doubt arise, it should be strongly compressed by two or three fingers, until no pulsation is felt, and then the fingers should be gradually relaxed until the comparative force with which the pulsation returns may be estimated; the degree of *compressibility* of the pulse, or the facility with which the pulsation may be entirely stopped, affording a tolerably good comparative notion of its strength. The degree of obesity of a patient should be attended to in estimating the strength of the pulse; for very fat persons have naturally a feeble pulse, and the pulsation is felt less distinctly through a layer of fat. A strong firm pulse is consistent with high health; for the heart contracts with vigour, when filled with healthy blood; but the strongest pulse, though scarcely compressible under the finger, has some degree of *softness*, if healthy. If there is a *hardness* in its beat, if it strikes the finger like a tense cord or wire, it shews a tendency to inflammatory disease, a phlogistic diathesis, as it has been called, consisting of a morbid fullness and tone of the arterial system. When with this *hardness* there is increased frequency, and some local pain, inflammatory fever is present. Some writers, indeed, carrying their dread of refinement in the discrimination of pulses too far, make light of all the distinctions, save of frequency; but we are persuaded that those who question the distinction between the soft, fluent, and undulating impression of a healthy pulsation, and the smart stroke, even when feeble, of an inflammatory pulse, must be somewhat deficient in the sensibility of their digital nerves, or in the attention which they bestow upon the subject.

The principal practical use that is made of this distinction between a *hard* and *soft* pulse, which is at the same time *quick*, is its indication of the propriety of blood-letting, or the contrary, in acute diseases. And if those who have denied the existence of the distinction, only intended to assert that such a distinction is not a sufficient guide in practice, they were in a great measure correct. For after all that can be observed of the pulse, we must accede to the statement of Celsus, that it is extremely deceptive, "*fallacissima res*;" and that it is only when taken into consideration in conjunction with the other symptoms of a disease, and with the general state of the constitution of a patient, that it can be relied on implicitly as a guide in the administration of remedies. But in conjunction with the other symptoms, the continuance or cessation of that smartness and cord-like tension in each pulsation will be an important index, as to the continuance or cessation of inflammatory action in acute disease, and therefore as to the extent to which evacuations ought to be carried.

In all diseases accompanied by *pain*, and especially when the pain is extremely severe, the state of the pulse is commonly the chief, sometimes the only index, by which the nature of the pain, whether it be *inflammatory* or *spasmodic*, is to be ascertained. (See PAIN.) This is sometimes of extreme importance; because a large dose of opium, which will speedily remove a spasmodic pain, will not only not alleviate, but will often greatly augment an inflammatory pain, and leave the disease to itself, at the only time when the active remedy, blood-letting, was likely to be beneficial. Mere pain, however violent, does not always quicken the pulse, and never produces that hardness in its beats which we have above alluded to. An able observer, the late Dr.

Heberden, has remarked; "it is often supposed that great pain will quicken the pulse; I am more sure that mere pain will not always do it, than I am, that it ever will. The violent pain occasioned by a stone passing from the kidneys to the bladder is often unattended with any quickness of the pulse; and the excessive and almost intolerable torture produced by a gall-stone passing through the gall-ducts never once quickened the pulse beyond its natural pace, as far as I have ever observed, though it be a disorder which occurs so very frequently; and this natural state of the pulse, joined with the vehement pain about the pit of the stomach, affords the most certain diagnostic of this illness. I have seen a man of patience and courage rolling upon the floor and crying out through the violence of this pain, which I was hardly able to lull into a tolerable state with nine grains of opium given within twenty-four hours, to which he had never been accustomed, and yet his pulse was all the time as perfectly quiet and natural, as it could have been in the sweetest sleep of perfect health." (Med. Transact. vol. ii. p. 32.) In such cases, without examining the pulse, a careless practitioner might proceed to a copious blood-letting, which might be injurious to a feeble habit, and would be productive of no relief; whence, on the other hand, if a violent inflammatory pain in the bowels were supposed (from not attending to the pulse, which would, in this case, be quickened,) to be merely spasmodic, as in colic, and no bleeding were employed, but a large dose of opium administered and repeated, no relief would be procured, and the inflammatory disease would probably pass on rapidly to a fatal suppuration or gangrene.

When gangrene has commenced, there is commonly a sudden cessation of the pain, and patients themselves and their attendants imagine that the pulse at this time will generally explain the real condition of the patients; for it will be found either quick and extremely feeble in its beats, or tremulous rather than pulsating, or probably altogether imperceptible at the wrist, implying that the powers of life are sinking, and that death, and not recovery, is impending.

With respect to the degree of disease and of danger, indicated by increased celerity in the pulse, we cannot do better than quote some of the observations of the late experienced Dr. Heberden. He says, "if the pulse either of a child or of an adult be quickened so as to exceed the utmost healthy limit by ten in a minute, it is an indication of some little disorder. But a child is so irritable, that during the first year a very slight fever will make the artery beat 140 times, and it will beat even 160 without danger; and as there begins to be some difficulty in counting the pulse when the motion is so rapid, the thirst, quickness of breathing, averseness from food, and above all the want of sleep, enable us better than the pulse to judge of the degree of fever in infants." Indeed, to shew how little can be determined by the state of the pulse in infants, Dr. Heberden adds, "a child of two years will die of an inflammatory fever, though the artery beats only 144 times in a minute; and I have seen a child of four years recover from a fever, in which it beat 156 times; and one of nine, where it beat 152.

"In adults ill of an inflammatory fever, the danger is generally not very great, where the beats are fewer than 100; 120 shew the beginning of danger, and they seldom exceed this number unattended with deliriousness, and where the patient does not die. There are two exceptions to this observation: the first is, that before some critical swelling or deposit of matter begins to shew itself in fevers, the pulse will be so rapid and indistinct as hardly to admit of being counted

counted; but I have known it certainly not less than 150, and yet the patient has recovered. Acute rheumatism affords a second exception, in which the artery will often beat above 120 times without any sort of danger; and in both these cases we may remark, that the appetite and senses and sleep and strength are put less out of their natural state, than where the life of the patient is in immediate danger.

"Though it may be difficult to count above 140 strokes in a minute, if they be unequal in time or in strength, yet where they have been very distinct, I have been able to count 180." Some authors have denied that the pulse can be distinctly counted when it exceeds 160; and in common fevers, before it reaches that degree of celerity, it is generally so feeble that its beats are very indistinct; there is one disease, however, in the latter stage of which the pulse retains a sharpness combined with extreme velocity, which renders it perfectly countable, even above the number stated by Dr. Heberden. We have distinctly counted 190 beats in the last stage of hydrocephalus; and Dr. Whytt, who observes that no patient dies of this disease, while his pulse remains under 130, in one case counted it at 210 on the day of death.

On the other hand, disease and danger are likewise indicated by a preternatural *slowness* of the pulse, which is usually connected with some degree of compression of the brain. Even in children, as Dr. Heberden remarks, "if the pulse be 15 or 20 below the natural standard, and if there be at the same time signs of considerable illness, it is a certain indication that the brain is affected, and consequently such a quiet pulse, instead of giving us hope, should alarm us with the probability of imminent danger." In adults, whenever the pulse is reduced to 50, or lower, if there be also a lethargic disposition, or stupor, danger of an apoplectic or paralytic attack is to be apprehended. During an attack of apoplexy, the continuance of the slowness of the pulse, together with the insensibility, heavy, slow, and stertorous breathing, and coma, is in the highest degree unfavourable, as indicating the great extent of the compression of the brain. The pulse, in these cases, is often under 40, and sometimes less than 30 in a minute. The operation of large doses of digitalis, and some other narcotic vegetable substances, also renders the pulse remarkably slow. The sudden change from quick to slow in the pulse, when it occurs in disease, is therefore to be considered as indicative of an unfavourable termination, if the other bad symptoms continue at the same time unalleviated: it is a proof not of the decrease of the disorder, but of the diminished irritability of the patient, the disease being transferred to the brain, and coma, palsy, apoplexy, or death, is to be apprehended.

Of the many fanciful variations of the pulse, which many writers a century or two ago indulged themselves with describing and naming, and with pointing out the indications to be deduced from them, as they are altogether incomprehensible to ordinary observers, we shall say nothing, referring those who have any desire to investigate the subject to the works of Bordeu, Nihel, Bellini, Massaria, and if they please to the various treatises of Galen.

We must observe, however, with Dr. Heberden, that though in many cases an useful index of the state of the health, yet the pulse is by no means a certain guide in all, and without a due consideration of concomitant symptoms may greatly mislead; for there are many anomalies observable respecting it. A good pulse, as that author observes, (which is sometimes found in comatose fevers,) with delirium, rapid loss of appetite and strength, sleeplessness, quickness of breathing, and great thirst, would afford very little hope; and a bad one without any of these might be

harmless. "I remember two young women," Dr. Heberden says, "ill together with others in the same house of the same infectious fever; the pulse of one of which was never above 84, and the pulse of the other was always extremely quick, and I once counted it when I thought her dying 180. Both of them recovered, and the latter quite beyond my expectation.

"Some books," Dr. Heberden remarks, "speak of *intermitting* pulses as dangerous signs, but I think without reason; for such trivial causes will occasion them, that they are not worth regarding in any illness, unless joined with other bad signs of more moment. They are not uncommon in health, and are perceived by a peculiar feel at the heart by the persons themselves every time the pulse intermits." We have generally considered these intermitting pulses as of dyspeptic origin, and have seen them removed, in fevers, by a purge. Where the pulse intermits, and is very unequal in its beats, and there is at the same time palpitation of the heart, oppression of the breathing, lividity of countenance, or other serious symptoms, then the intermission is probably one among the signs of some affection of the heart; but in ordinary cases, occurring with symptoms of indigestion, or slight feverishness, it is perfectly void of danger. It is curious, indeed, that irregularities of the pulse are sometimes habitual, and disappear only with good health. Dr. Heberden says, "many persons will likewise have unequal pulses without any other sign of ill health. I have met with two who, in their best health, always had pulses very unequal, both in their strength and the spaces between them; and upon their growing ill, their pulses constantly became regular; and it was a never-failing sign of their recovery, when their arteries began again to beat in their usual irregular manner." Med. Transf.

PULSE is also used for the stroke with which any medium is affected by the motion of light, sound, &c. through it.

Sir Isaac Newton demonstrates, lib. ii. prop. 48. Princip. that the velocities of the pulses in an elastic fluid medium (whose elasticity is proportionable to its density) are in a ratio compounded of half the ratio of the elastic force directly, and half the ratio of the density inversely: so that in a medium whose elasticity is equal to its density, all pulses will be equally swift.

PULSE, in *Agriculture*, a term applied to all leguminous plants, as pease, beans, tares, vetches, lupins, &c. Many of these are highly valuable as food, and for being made into hay.

And all the species and varieties of pulse afford great abundance of excellent manure when turned into the soil, in the state in which nature presents them. The custom of ploughing in green succulent plants of this kind is very ancient. All the Roman writers commend it highly. Columella, particularly, advises lupins as a manure, which, if cut down and turned in while green, will have as good effect as the best and strongest dunging whatever. They may be sown upon poor land about the middle of September, and be ploughed in before they attain their full growth. In gravelly soils they should be cut down after they have put forth their second flower; and in strong lands, when a little more advanced. In the former of these grounds they are turned in while young and tender, that they may quickly rot; and in the latter, are let stand till they grow stronger, that they may produce a better effect on the stiff clods of earth, and render them more mellow and friable. Pease, beans, lupins, vetches, and other succulent plants, have also been strongly recommended by the older writers on husbandry, as excellent manures, especially for sandy ground. These plants en-

rich the earth greatly if ploughed in either green, or when in bloom. In strong land they are advised not to be turned down till the pods begin to harden.

PULSE Crops, any of those crops which have been just noticed. In improved husbandry they are now seldom cultivated with the view of being turned in as manure, but as a row or green crop, for the purpose of cleaning and improving the land, being mostly interposed between those of the white corn kind, so as to prevent the necessity of having so frequent recourse to the more uneconomical practice of naked fallowing. In this way they are found highly beneficial. And Lister has recommended for the improvement of sandy, light ground, or any clay well fanded, all plants of the pulse or pea kind, and particularly, upon experience, the wood vetch, which, besides its being perennial, (at least with respect to its roots,) and its thriving even in woods and among bushes in almost every country, has these qualifications, that it shoots out a thousand roots far and wide, and spreads itself under ground, like quick-grass; whilst it is so rampant above ground, that it will climb a fathom and a half upon measure, and preserve itself in spite of weeds or drought. It may be set as well as sown, in furrows. For the former of these purposes the roots may be dug up in September, which is also the time for gathering the ripe seed. The growth of the plants will be greatly advanced by setting their roots; for the older they are, the stronger, more numerous, and fuller of buds their shoots will be. He sowed in the latter end of March the seed which he had gathered in September, and had that year a very great increase, the bed being thick covered over with grass above two feet high: but it did not flower that year. He reckoned that one pea had put forth above thirty shoots in August of the first year. In the second year it flowered by the middle of June, and bore a wonderful crop, the roots being innumerable. He has observed this pea very common in all the mountains as well as plains of this country where bushes or hedges are. Both the pea and grass are very sweet, and very agreeable to cattle, as he has found on trial. See **VETCH**.

But buck-wheat and vetches are the two plants most commonly sown in this country for being turned in as manure. The best time for ploughing them in is when they are coming into bloom; being then in their most succulent state. Some farmers turn down their second crop of clover to enrich the land for wheat in the autumn. This should be done early enough to give the plants sufficient time to putrify thoroughly before the grain is sowed; otherwise it might prove prejudicial.

However Mr. Elliot, of America, prefers millet to every other plant for green dressing of land, on account of the cheapness of the seed, and the largeness of the stalks and leaves, which must afford a good coat to turn in when ploughed. An old farmer who had long been in the practice of green dressing, assured him that he had increased the strength of his land to a great degree, in a few years, by the following method: After his oats were harvested, he added a little seed to the scattered grains, and then ploughed them in. Towards the end of September, he ploughed in the green oats, and sowed rye; and the next summer, when the rye was well grown and full of sap, he ploughed that in at the usual sowing season, then sowed wheat, and always had a large crop. See **BEANS**, **BUCK-Wheat**, **PEASE**, &c.

PULSE-Glass, a well-known instrument invented by Dr. Franklin, and serving to shew the quick evaporation which would take place if we had no atmosphere. This is a small tube with a bulb at each end, exhausted of its air, and con-

taining a small quantity of spirits of wine. If this instrument be held sloping, with one end in the palm of the hand, the heat of the hand will quickly cause the spirit to boil, but the vapour rising to the other end becomes condensed as soon as it is in contact with the cold glass. This shews that a very small degree of heat would be sufficient to evaporate most fluids, if we had no atmosphere. It also shews, that evaporation produces cold; for at the instant when the spirit begins to boil, a sensation of sudden cold is felt on that part of the hand where the bulb rests.

PULSILOGIUM, a name given by authors to a pulse-watch, or instrument to measure the celerity of the pulse. Sanctorius was the first inventor of this machine; but several have since spoken very largely in favour of it, and sir John Floyer wrote a treatise on this subject.

PULSION, formed from *pello*, *I drive*, the act of driving or impelling a thing forwards.

PULSLATER BAY, in *Geography*, a bay on the S. coast of Wales, and county of Pembroke; two miles N. of St. Gwen's Head.

PULSNITZ, or **POLSNIZA**, a town of Lusatia, on a river of the same name, with a citadel; 15 miles N.E. of Dresden. N. lat. $51^{\circ} 10'$. E. long. $13^{\circ} 59'$.

PULST, a town of Bavaria, in the bishopric of Bamberg; two miles S.W. of Mark Schorgast.

PULSUS LATUS. See **LATUS Pulsus**.

PULTAVA, in *Geography*. See **POLTAVA**.

PULTENÆA, in *Botany*, received that appellation from the writer of the present article, in honour of his friend Dr. Richard Pulteney; (see that article.)—Sm. Bot. of New Holland, 35. Ann. of Bot. v. 1. 502. Willd. Sp. Pl. v. 2. 506. Ait. Hort. Kew. v. 3. 17.—Class and order, *Decandria Monogynia*. Nat. Ord. *Papilionacea*, Linn. *Leguminosæ*, Juss.

Gen. Ch. *Cal.* Perianth inferior, of one leaf, permanent, bell-shaped, two-lipped; the upper lip in two deeply separated, broadish segments; lower in three narrower ones, about the same length; with a lanceolate appendage at each side, between the two lips, sometimes at the base of the tube. *Cor.* papilionaceous, of five petals, with claws; standard obovate, emarginate, ascending; wings two, half-obovate, shorter than the standard, with an angle at the upper edge; keel as long as the wings, of two obovate petals, cohering by their lower edge, with an angle, toward the base, above. *Stam.* Filaments ten, separate, awl-shaped, nearly equal, declining, rather shorter than the keel, anthers small, roundish, two-lobed. *Pist.* Germen superior, sessile, ovate, with rudiments of two seeds; style awl-shaped, ascending; stigma simple, acute. *Peric.* Legume a little longer than the calyx, ovate, acute, turgid, of one cell and two valves. *Seeds* two, roundish-kidney-shaped, on short stalks, inserted into the upper edge of each valve, near the base, "with a lobed notched appendage." *Brown*.

Ess. Ch. Calyx five-cleft, two-lipped, with an appendage at each side. Corolla papilionaceous; wings shorter than the standard. Germen sessile. Style awl-shaped. Stigma acute. Legume of one cell, with two seeds; their appendages lobed and notched.

1. *P. stipularis*. Scaly Pultenæa. Sm. Bot. of N. Holl. 35. t. 12. Tr. of Linn. Soc. v. 9. 245. Curt. Mag. t. 435. Willd. n. 1. Ait. n. 6.—Leaves linear, pointed, flat, somewhat fringed, straight. Stipulas solitary, divided, two-ribbed, torn, rather spreading. Heads many-flowered. Native of New South Wales. First raised from seed, in 1792, in the garden of Benjamin Robertson, esq. at Stockwell. It is a green-house shrub, flowering from April to July. The stem is determinately branched; the branches clothed

clothed with crowded, rather spreading *leaves*, an inch long, narrow, deep green, most fringed in an early state, on short flat *stalks*, with intrafoliaceous, solitary, deeply cloven, acute, chaffy *stipulas*. *Flowers* of a golden yellow, in large, terminal, solitary heads; their standard marked with a purple ring. *Calyx* reddish; its appendages inserted about the middle of the tube. *Legume* brown, invested below with the withered *calyx*, and crowned with the recurved *style*.

2. *P. vestita*. Awned Pultenæa. Brown in Ait. Hort. Kew. n. 7.—“Leaves linear-lanceolate, pointed, smooth; their edges inflexed. *Stipulas* fringed. *Flowers* axillary. *Calyx*-teeth and appendages awned.”—Gathered by Mr. Brown on the south coast of New Holland. Introduced at Kew, in 1803, by Mr. Peter Good. It flowers, in the green-house, from April to July.

3. *P. paleacea*. Chaffy Pultenæa. Sm. Tr. of Linn. Soc. v. 9. 246. Willd. n. 2.—Leaves linear, pointed, revolute; recurved at the point. *Stipulas* solitary, two-ribbed, sheathing, membranous, torn. Heads of few flowers.—Gathered in New South Wales, by John White, M. D. This *shrub* is much smaller, and more branched, than *P. stipularis*; with small, but very numerous, heads of yellow *flowers*, whose long pointed *bractæas* rise much above them. *Leaves* silky beneath, with close-pressed hairs, but not fringed. *Stipulas* dilated, thin, membranous, white, with two brown ribs; they embrace the stem, and are very conspicuous, though liable to be injured, and partly obliterated, by time and weather.

4. *P. elliptica*. Elliptical Pultenæa. Sm. Tr. of Linn. Soc. v. 9. 246.—Leaves elliptical, concave, rather hairy. *Stipulas* solitary, two-ribbed, villous, imbricated. *Flowers* axillary.—Native of Port Jackson, New South Wales. The *leaves* differ from all other known *Pultenææ*, with simple *stipulas*, in their elliptical form. They are concave above; convex, and rough with prominent points, beneath; their margin now and then furnished with long loose white hairs. *Stipulas* intrafoliaceous, simple, closely pressed to the branches, and so long as to lap over each other; their shape likewise is elliptical, with two ribs and an intermediate furrow, and they are shaggy with white hairs. *Flowers* deep yellow, axillary, but so crowded about the tops of the branches as often to seem terminal and capitate, at least till the *fruit* advances. Appendages attached to the base of the *calyx*, whose teeth are long, slender, and hairy.

5. *P. linophylla*. Flax-leaved Pultenæa. Schrad. Sert. Hannov. 28. t. 18. Willd. n. 3. Sm. Tr. of Linn. Soc. v. 9. 247. Ait. n. 5.—Leaves linear, abrupt with a small point, hairy. *Stipulas* minute, in pairs. *Bractæas* ovate, shorter than the *calyx*. *Flowers* capitate.—From the same country. It first flowered at Kew, in January 1791, and was given us by Mr. Aiton. Its habit is more upright and wand-like than *P. paleacea*, n. 3; the *leaves* somewhat angular and dilated at their apex, as well as slightly pointed. The minute separate *stipulas*, shorter than the *footstalks*, and the ovate blunt *bractæas*, which, instead of rising above the *flowers*, are shorter than the *calyx*, abundantly distinguish this species from all the foregoing.

6. *P. retusa*. Obtuse-leaved Pultenæa. Sm. in Ann. of Bot. v. 1. 502. Tr. of Linn. Soc. v. 9. 247. Ait. n. 4.—Leaves linear, abrupt, pointless, smooth. *Stipulas* minute, in pairs. *Bractæas* ovate. *Flowers* capitate.—Native of New South Wales. Said to have been introduced at Kew, by Sir J. Banks, in 1789. It flowers in the green-house in April and May. This is very like the last in habit, but the *leaves* are quite smooth, and moreover not dilated at their apex. We have found the *bractæas* shorter than the *flower-*

stalks; but Mr. Brown characterizes them as rather longer than the *calyx*; so that it appears they are variable in this respect.

7. *P. scabra*. Rough-leaved Pultenæa. Brown in Ait. n. 3.—Leaves wedge-shaped, revolute, abrupt, with a bristly point; rough above; villous beneath. *Stipulas* in pairs, setaceous, recurved. *Flowers* capitate.—Found in New South Wales, by Dr. Brown, and sent to Kew, in 1805, by Mr. G. Caley. It blooms from May to July. There are said to be but few *flowers* in each head.

8. *P. obcordata*. Heart-leaved Pultenæa. Andr. Repof. t. 574. Brown in Ait. n. 2.—Leaves inversely heart-shaped, abrupt, smooth, with a spinous point. *Stipulas* minute, in pairs. *Flowers* capitate.—Gathered in Van Diemen’s island by Mr. Brown. Sent to Mr. Lambert from thence by Mr. Littlejohn, in 1808. It is a green-house plant, flowering in summer, and differs from the following chiefly in the obcordate shape of its *leaves*, which are nearly half as broad as they are long. The *flowers* are large and handsome, yellow, variegated with purple. Their appendages stand about the middle of the *calyx*.

9. *P. daphnoides*. Daphne-like Pultenæa. Sm. in Ann. of Bot. v. 1. 502. Tr. of Linn. Soc. v. 9. 247. Andr. Repof. t. 98. Curt. Mag. t. 1399. Willd. n. 6. Ait. n. 1.—Leaves obovate, smooth, with a spinous point. *Stipulas* minute, in pairs. *Flowers* capitate. *Bractæas* ovate, shorter than the *calyx*.—This was among the first plants received from New South Wales; we had specimens from Dr. White in 1789. It was also raised from seed in the gardens soon afterwards, and has attracted general notice by its size and beauty, vying in those particulars with *P. stipularis*, n. 1. The *leaves* are about thrice as long as broad, obovate; not obcordate like the last. *Stipulas* separate, very small. *Flowers* large, yellow, with a purple keel, and purplish-brown hairy *calyx*, forming large heads at the tops of the branches.

10. *P. flexilis*. Shining-leaved Pultenæa. Sm. in Ann. of Bot. v. 1. 502. Tr. of Linn. Soc. v. 9. 248. Ait. n. 9.—Leaves linear, somewhat obovate, flat, with a small point, quite smooth, as well as the *calyx*. *Stipulas* longer than the *footstalks*. *Flowers* axillary.—Native of New South Wales, where the late Col. Paterson is said to have first discovered it. Sir Joseph Banks sent seeds to Kew, about the year 1801. It flowers in the green-house in spring, and is an elegant, slender, rather drooping *shrub*, quite smooth in every part, with shining *leaves*, of a dark green, and copper-coloured *branches*. The foliage which usually attends the *flowers* is sometimes deficient, so that the latter become in appearance racemose, but the *stipulas* are always present. The perfectly smooth-sided *calyx* distinguishes this species from all the rest.

11. *P. villosa*. Villous Pultenæa. Sm. in Willd. n. 5. Ann. of Bot. v. 1. 503. Tr. of Linn. Soc. v. 9. 248. Ait. n. 8. Sims in Curt. Mag. t. 967.—Leaves elliptical, concave, hairy, as well as the stem and *calyx*. *Flowers* axillary.—From the same country; sent by Dr. White among his earliest communications. This is a dense bushy *shrub*, with numerous short leafy *branches*, and copious axillary solitary yellow *flowers*. The *leaves* are scarcely half an inch long, oval, concave, pointless, clothed with prominent hairs; and the *branches* are more densely villous. *Stipulas* longer than the *footstalks*, often connate. No *bractæas* are observable. The appendages of the *calyx* originate from near its base, and are longer than its tubular part, having a more leafy appearance than in any other species of *Pultenæa*. Mr. Andrews has published under the name of *P. villosa*, t. 309,

a very different shrub from the above, constituting a new and distinct genus, which the writer of the present article has named *Aotus villosa*, in Ann. of Bot. v. 1. 504, and which is figured under that appellation in Curt. Mag. t. 949.

PULTENEY, RICHARD, in *Biography*, a distinguished literary botanist and practical conchologist, as well as an able physician, was born at Loughborough, Feb. 17, 1730. He first settled as a surgeon and apothecary at Leicester; but having been educated as a Calvinistic dissenter, the good Christians of that town, who chanced to have different prejudices, of course gave him but little support. He struggled against pecuniary difficulties with economy, and shielded his peace of mind against bigotry, in himself or others, by looking "through Nature, up to Nature's God." His remarks and discoveries were communicated first to the Gentleman's Magazine, in 1750, as well as several subsequent years; and he intermixed antiquarian studies with his other pursuits. His botanical papers printed by the Royal Society, on the Sleep of Plants, and the Rare Plants of Leicestershire, procured him the honour of election into that learned body in 1762. In 1764 he obtained a diploma of Doctor of Physic from Edinburgh, even without accomplishing that period of residence, then usually required, and now indispensable; and his thesis on the *Cinchona officinalis* amply justified the indulgence of the university.

Soon afterwards, Dr. Pulteney was acknowledged as a relation by the earl of Bath, who had moreover imbibed a favourable opinion of his talents; which circumstances induced him to attach himself to that nobleman, as travelling physician. His lordship unfortunately died soon after, on which the subject of our memoir, becoming at a loss for a situation, hesitated whether to settle at London or elsewhere; but he soon decided in favour of Blandford in Dorsetshire, where there happened to be a vacancy. Here he continued in great reputation, and extensive practice, till his death, which happened on the 13th of October 1801, to the deep regret of all who knew him, in the 72d year of his age. His disease was an inflammation in the lungs, of only a week's duration.

Dr. Pulteney married, in 1779, Miss Elizabeth Galton, of Blandford, a lady who bore him no children, but whose society and attainments contributed very essentially to his happiness, and who has in every respect proved herself worthy of her amiable and distinguished husband. His remains were interred at Langton, near Blandford, a tablet to his memory having been placed, by his widow, in the church of the last-mentioned town. This monument is decorated with a sprig of the *PULTENÆA stipularis*, see that article; but in obedience to the strict commands of the deceased, the inscription is of the simplest kind.

As an author, Dr. Pulteney was conspicuously distinguished, by his General View of the Writings of Linnæus, and his Sketches of the Progress of Botany in England. The former, published in 1782, in one volume 8vo., has contributed more than any work, except perhaps the Tracts of Stillingfleet, to diffuse a taste for Linnæan knowledge in this country. It proved a very popular book, and a new edition was soon called for. This however did not appear during the author's life; but has been published by his learned and much-valued friend Dr. Maton, who has prefixed, to this handsome quarto, portraits of Linnæus and his biographer, with a life of the latter, to which we are principally indebted for the above particulars. A translation of Linnæus's celebrated manuscript diary of his own life is subjoined. Of this we have spoken in its proper place. See LINNÆUS.

The "Sketches of the Progress of Botany," making two octavo volumes, appeared in 1790, but did not become so popular as the Account of Linnæus. These volumes, nevertheless, abound with original and valuable information; nor is it any reproach to the memory of their intelligent author, that they do not contain, as he was well aware, all that might have been collected on every subject. Their most learned readers will ever be more sensible of their merits than their defects.

Dr. Pulteney had been associated with the Linnæan Society, soon after its first institution, and he ever retained a great attachment to that body, as well as to its founder. Several of his papers appear in the Transactions of the Society; and he gave a final proof of his regard, in the bequest of his valuable museum of natural history. He stipulated that his collections should always be kept separate from any others which the Society might possess; and he provided that it should be at the option of the members, either to keep this museum entire, or to dispose of it, in order to raise a fund, whose interest should be expended annually in a medal, for the best botanical paper read before the Society in the course of the year. It was without hesitation determined, that these treasures should be preserved entire, as the best and most useful memorial of a benefactor to science, to whom a large portion of this corporate body were individually and strongly attached. Few men have enjoyed more entirely the respect and affection of his acquaintance than Dr. Pulteney. An air of urbanity and gaiety was diffused over his countenance and manners, which bespoke the simplicity, candour, and liberality of his mind. His ardour for science was unbounded; and as lively at the close of his life, as at the beginning of his literary career. His religion was unaffected, and devoid of bigotry or intolerance; the only feelings which he contemplated without sympathy or indulgence. His conversation, like his morals, was spotless; and his cheerfulness flowed from the never-failing spring of a benevolent and honest heart. Pulteney's Works. Maton's Memoirs of Dr. Pulteney, prefixed to his View of the Writings of Linnæus.

PULTENEY'S *Island*, in *Geography*, an island in the Mergui archipelago, of an oval form, about eight miles in circumference. N. lat. 10° 46'.

PULTURA, formed from *pulsare*, to knock, to ask, in our *Old Law Books*, denotes a previous demand or examination: on account of the monks, who, before they were admitted into the monasteries, *pulsabant ad fores*, knocked at the doors for several days. "Et volo, ut sint quieti de omnibus causis, et querelis, et placitis ballivorum et præpositorum hundredi, et a pultura serjanorum," *i. e.* from the examination of serjeants; "et de rewardo forestarum," *i. e.* the visitation of the forests.

PULTUSK, in *Geography*, a town of the duchy of Warsaw, late in Masovia, on the Narew; 25 miles N.N.E. of Warsaw. N. lat. 52° 36'. E. long. 21° 10'.

PULVERARIA, in *Botany*, so named from its powdery habit, a genus of *Lichenes* in the *Methodus* of professor Acharius, subsequently sunk in his *Lepraria*. See LICHENES.

PULVERATICUM, in *Roman Antiquity*, the fee paid to surveyors for their trouble; also a sum exacted from the provincial cities by their garrison.

PULVERIZATION, PULVERIZATIO, the art of pulverizing, or reducing a dry body into a fine powder.

This is performed, in friable bodies, by pounding or beating in a mortar: but to pulverize malleable ones, other methods must be taken.

To pulverize lead, or tin, the method is this: rub a round wooden box all over the inside with chalk; pour a little of the melted metal nimbly into the box, when, shutting the lid, and shaking the box briskly, the metal will be reduced into powder.

PULVERIZATION, in *Agriculture*, the separation of the earthy particles of soils, in such a manner, as to render them of a fine mellow mouldy quality, or to partake of the nature of powder. This state of mould is obtained in different ways, as by frequent ploughing and harrowing in the less stiff sorts of land; and in those of the more heavy and retentive descriptions, by the same means, and the frequent exposure of them to the influence and effects of the atmosphere, with the growth of such sorts of crops as produce a close thick shade upon them. This state of the soil, when produced in lands, has various advantages, the roots of plants penetrate it with more readiness and greater facility. It admits of the particles of moisture more equally, and in a more extensive manner, by which the fibrous roots of the crops are more fully supplied with nourishment. It likewise produces a more equal and regular mixture of the different materials of which the soils are constituted or composed, so as to yield the nutrition of plants in a more extensive and abundant manner. The rains in the vernal months are also, by this means, more abundantly drank up and retained, in consequence of their sinking to a greater depth, as well as more equally diffused through the different parts, from which much advantage is derived in the support of the crops. By this fineness in the particles of the soils, the manures, or other ameliorating substances, are also more extensively and more perfectly blended and incorporated with them, and of course a more equal and abundant supply of nutritious materials provided for the growth and increase of the crops, of whatever kind they may be. And the air of the atmosphere is more intimately and abundantly received and blended with them. These are a few of the various advantages that may be derived from the pulverization of land; but there are many others noticed by writers on agriculture and rural economy. See **FALLOWING**.

In consequence of these beneficial effects, it is evidently a state of tillage that ought as much as possible to be aimed at by the intelligent cultivator, by the judicious ploughing, harrowing, and laying up of his lands, at those seasons when they can be the most acted upon and influenced by the extensive operation of atmospherical and other agents. See **PLOUGHING** and **TILLAGE**.

PULVILLUS, in *Surgery*, a term used to express a little pledget-bolster, or compress.

PULVINARIA, in *Roman Antiquity*, cushions upon which the statues of the gods were laid in the temples, at the time that thanks were given for some signal victory.

PULVINATED, **PULVINATUS**, in the *Ancient Architecture*, a term applied to a frieze, which swells, or bulges out, in manner of a pillow, *pulvinus*: whence the name.

PULVIS, in *Chemistry* and *Medicine*. See **POWDER**.

PULVIS Antilyssus, was originally composed of equal parts of the lichen cinereus terrestris, or ash-coloured ground liverwort, and black pepper; but this quantity of pepper rendering the medicine too hot, only one part of the pepper is now used to two of the lichen. See **ANTILYSSUS Pulvis**, and **LICHEN**.

PULVIS Fecundans, in *Natural History*, a name given by late writers to that fine powder, which is contained in capsules upon the stamina or threads in the flowers of plants, and is called by some English writers the *male-dust*, and in

general the farina of flowers. See **FARINA**, and **FECUNDATION of Plants**.

PULVIS Fulminans, or the thundering powder. See **FULMINANS**.

PULVIS Patrum, the Jesuit's powder. See **CORTEX Peruvianus**.

PULVIS Puteolanus, in *Natural History*, the name of a fossil substance, found in form of powder, and famous for its consolidating under water. The accounts of it seem, however, to be a little erroneous. See **POZZOLANA**.

PUMICE-STONE, Lat. *Pumex*, Fr. *Pierre Pome*, in *Mineralogy*, a light, spongy, vitreous stone, found in the neighbourhood of certain volcanoes, and used for polishing metals and marble, and smoothing the surface of wood and pasteboard. It is said to form a good glaze for pottery. The specific gravity of the lighter pumice-stones does not exceed 0.914; they swim on water. The constituent parts of pumice from Lipari, according to Klaproth, are,

Silex	-	-	-	-	-	75.5
Alumine	-	-	-	-	-	17.5
Oxyd of iron, and a trace of manganese						1.75

The characters of the different kinds of pumice, and the situation from which they are chiefly procured, are perspicuously described by Dolomieu, in his "Voyages aux Isles de Lipari."

The island of Lipari, he says, is an immense magazine of pumice-stones for all Europe; notwithstanding the quantity which has been taken away, they do not appear diminished. Whole mountains are entirely formed of pumice. Quarries of vast extent have been dug in this stone at the feet of the mountains, and in the vallies the whole island appears to have a base of this singular substance. The essential characters of the pumice-stones of Lipari are a white or greyish-white colour, a coarse grain, and a fibrous texture. The pores are long; they have a glassy or silky lustre. Pumice-stones are generally lighter than common solid lavas, and are less hard. They are nearly free from admixture with iron, and to the absence of this metal part of their qualities is to be attributed. Pumice-stones may be divided into five species.

The first are grey, and have a compact grain, the pores and fibres being scarcely discernible: they have a considerable degree of weight and solidity: the fracture presents a surface somewhat vitreous. These stones are easily worked, and much used in the island for masonry. The city of Lipari is almost entirely built of this variety of pumice.

The second kind of pumice is equally grey, but much lighter and more porous; the fibrous texture is more strongly marked than in the preceding species, but these stones will not float on water. They are used in the construction of cellars, and are exported in great quantities into the maritime towns of Naples and Sicily. The third kind are light, porous, and fibrous, they have a silky lustre when broken, they swim on water, and unite a coarse grain with a certain degree of consistence, which fits them for the purpose of polishing marbles and metals. These are the only kind of pumice-stones known in foreign countries. The fourth species is a very white and extremely light stone, of a loose texture, and a slight degree of consistence. It appears to have arrived at the extreme degree of rarefaction which a substance can attain, and preserve a union of its parts. It is not used for any purpose. When it falls into the sea, it swims on the surface, and is carried to a great distance, being commonly found on the coasts of Sicily, Calabria, and the kingdom of Naples. A fifth species of pumice might be added, which is formed of the latter species, rarefied by heat, so as to have the affinity of aggregation of the particles destroyed,

destroyed, and is pulverized by a kind of volatilization. Pumice-stones appear to have flowed in the manner of lavas, and like them to have formed great currents, which are found at different depths over each other round the group of mountains in the centre of Lipari. They are thus piled in great homogeneous masses, in which quarries are opened for building stone. The heavy pumice occupies the lower part of these currents or masses; the light pumice-stones are above. This arrangement is conformable to that of common currents of lavas, of which the porous lavas always occupy the upper part. This position proves the identity of the nature of the heavy solid pumice with that which is light and porous, and shews that this great lightness is not an essential character of these stones. The elongated fibre of pumice-stones is always in the direction of the volcanic currents, and appears to have depended on the semifluid state of the lava, which draws out in threads, like melted glass.

When pieces of pumice-stone have the fibres bent in every direction, we may be assured, says Dolomieu, that they have been ejected in detached masses, and have never been part of the current. The silky threads of pumice are almost a perfect glass. Spallanzani, who visited Lipari after Dolomieu, describes the Campo Bianci, from whence most of the pumice-stones are procured, as a lofty and extensive mountain, formed wholly of white pumice-stones. When seen at a distance, it excites the idea that it is composed entirely of pure snow, from the summit to the foot. This prodigious mass of pumice is not one solid whole, but an aggregation of numerous beds of pumice successively placed on each other; which beds are distinguishable by their colour, and in many places project from the mountain. They are almost always disposed horizontally, and their position is not dissimilar to stratification. Each bed of pumice does not form a distinct whole, but it consists of an aggregate of globular masses of pumice united together, but without adhesion. Hence Spallanzani is led to infer that these pumices were thrown out of the volcano in a state of fusion, and took a globular form in the air, which they preserved at the time of their sudden congelation. We have, however, many instances, in the mineral kingdom, of substances assuming a globular form, which we cannot suppose to have been thrown out of volcanoes in detached masses; as in mountains of basalt and granite, and even in some lime-stone. In the process of glass-making, various phenomena are frequently presented, which, if properly attended to, would elucidate the formation of many volcanic products, and particularly of their tendency to assume a globular form. "Glass vessels are well known to be convertible into Reaumur's porcelain, by the internal arrangement of their particles, without losing their external form, and consequently at a temperature much below that requisite for fusion. The change of glass into Reaumur's porcelain does not arise from an evaporation of the alkali, as has been asserted, but from a regular arrangement of the molecules of the glass. It commences by the formation of fibres perpendicularly to the surface of the glass, and penetrating into it. At nearly the same time, smaller radiated globules are formed in the interior of the glass, and the re-union of these with the fibres by their mutual increase, forms the whole into a new substance." See Experiments of G. Watt, Phil. Transf. 1804.

The globes of pumice on the mountains of Lipari were probably formed by a similar arrangement of the particles during the cooling of the lava. A great quantity of these globular pumices, which Spallanzani observed on the sea-shore near Campo Bianci, were probably detached from the mountain by gradual disintegration, for it scarcely seems possible, for balls of a substance so light and frangible to

have preserved their form in falling; or if we suppose them to have been in a semifluid state, they must have been flattened by the fall. It is a singular fact, that the islands of Lipari and Vulcano are almost the only volcanoes in Europe that produce pumice-stones in considerable quantities. Dolomieu suggests that this may be owing to the nature of the mountains in which the volcanoes break out, and to the great degree of heat which has been in action. From the similarity of the constituent parts of felspar and pumice, it may be inferred that felspar, or granitic rocks containing a large portion of felspar, have been the substances from which pumice was formed, but a more than common degree of heat appears to have been requisite. The immense bed of lava which burst from the sides of Etna in 1669, and traversed Catania, has, according to Dolomieu, a base of granite, the constituent parts of which are not changed. When this lava is exposed to a strong heat in a furnace, it vitrifies, and is changed into an opaque porous frit, resembling pumice, a certain proof, adds Dolomieu, that this vast bed, by a more active heat, would have been converted into stones similar to those of Lipari.

By a long continued heat, pumice-stone melts into a vitreous, semi-transparent mass, in which a number of small crystals of white felspar are discernible. By intense heat, common glass is in some instances so rarefied as to resemble pumice. Brongniart describes a red pumice found on Vesuvius, and a greenish pumice from the external volcanoes of Auvergne. Ferrara also mentions a stone ejected from Etna in 1802, of which one half was lava and the other half pumice. Probably this was formed from a rock composed of hornblende and felspar. Some geologists have carried their attachment to theory so far, as to deny the volcanic origin of pumice, because it is sometimes associated with rocks, which they assert were not of igneous formation. To this opinion it will scarcely be thought necessary to reply, further than to observe that pumice is sometimes seen floating on the sea, at a vast distance from land, which appearance can only be accounted for by the action of submarine volcanoes. Mr. Dove, captain of an Indiaman, observed immense quantities of pumice on the Atlantic ocean, in S. lat. $35^{\circ} 36'$ W. long. 9° ; the shoals of it continued floating over the surface of the sea for several days, and extended 317 miles. Phil. Transf. vol. xxxv. p. 444.

The volcanoes of the Molucca islands are said to eject such prodigious quantities of pumice, that the ocean sometimes appears covered with it for many leagues.

Though Dolomieu describes a white or greyish-white colour as a distinguishing character of the pumice-stones of the Lipari islands, it would appear, from the description of Brongniart and Ferrara, above referred to, that pumice may be of various colours, according to the nature of the stone which has been fused; but rocks which melt into a colourless glass, and are composed principally of felspar, seem to be the base from which most pumice-stones have been formed. See VOLCANO.

PUMMEL. See POMMEL.

PUMP, ANTLIA, in *Hydraulics*, a machine formed on the model of a syringe, for raising of water.

Vitruvius ascribes the first invention of pumps to Ctesibius the Athenian; whence the Latins call it *machina Ctesibiana*, or *organum Ctesibicum*.

Pumps are distinguished into several kinds, with regard to the several modes of their acting. As the

Common sucking-pump, which consists of a pipe open at both ends, in which is a moveable piston, bucket, or sucker, as big as the bore of the pipe in that part in which it works, and leathered round so as to fit the bore exactly; and may be

PUMP.

be moved up and down, without admitting any air to come between it and the pipe or pump barrel. There are several kinds of buckets: the most simple of all, which is commonly used for ordinary pumps, consists of a cylindric piece of wood, whose diameter is somewhat less than the bore of the barrel, that it may move in it freely, having a hole quite through the middle of it. Upon the top of this there is an iron piece fastened to a rod of iron or wood, which goes quite to the top of the pump, and by means of which the motion is given to the bucket. Near the top of the cylindric wood, there is a leather ring fastened round it, which goes a little higher than its top: the hole in the wood is stopped by a valve, made of a round piece of leather, fastened in one part of the wood with nails. Upon this there is an iron plate, a little larger than the bore of the hole, and another iron plate under it, a little less than the same bore; and the plates and leather are fastened together by means of a rivet or screw in the middle of them. When the bucket is put into the barrel, and the leather becomes wet, it will apply itself to the sides of the barrel, and prevent the passage of the air. The use of the two iron plates is to sustain the pressure of the water which would otherwise bend the leathers. For larger pumps, the bucket is made in the following manner: there is a hollow piece of brass, almost equal at top to the bore of the barrel, but small at the bottom, having at its top a brass bar, and at the bottom two notches to receive the ends of another brass bar, of the same figure as that at the top. Round the brass piece there goes a leathern ring, fastened to it at its lower part by means of an iron ring, which, being almost at the bottom of the brass piece, is not so large as its top, and consequently does not touch the sides of the barrel: this leathern ring should go a little higher than the cross-piece at bottom. The valve consists of a piece of leather almost equal to the top of the brass piece, covered by two iron plates of the same size as the leather, and having under it two plates somewhat smaller than the bore of the brass piece at its top; these iron plates and leathers are fastened together with screws. This valve must be applied to the top of the brass piece or box, so that the brass bar upon it may be between the two iron plates under the leather. The whole is fastened together by means of an iron piece, whose lower part goes through the holes in the middle of the valve, and the two brass rods, so that its upper part getting between the two upper iron plates of the valve, presses upon the leather, and makes it apply itself close to the upper brass bar. This iron piece or rod ought to have two holes, one at the bottom, just under the lower brass rod, to hold it close by means of a pin or key; and another at its top, to fasten it to another iron rod, which is continued quite to the top of the pump, in order to give motion to the bucket. The chief advantages of this kind of buckets are, that they give the freest passage to the water, having the least friction possible, as they touch the barrel only at the upper end of the brass box; and that the sand or gravel, which is commonly mixed with the water, cannot get between the bucket and the barrel, because the leathern ring is higher than the brass tube; besides, if by any accident the motion of one side of the valve were hindered, the other would serve till it were mended. See VALVE.

The construction of pumps is usually explained by glass models, in which the action both of the pistons and valves may be seen. In order to understand the structure and operation of the common pump, let the model DCBL (*Plate XIV. Hydraulics, fig. 4.*) be placed upright in the vessel of water K, the water being deep enough to rise at least as high as from A to L. The valve *a* on the

moveable bucket G, and the valve *b* on the fixed box H, (which box quite fills the bore of the pipe or barrel at H,) will each lie close, by its own weight, upon the hole in the bucket and box, until the engine begins to work. The valves are made of brass, and covered underneath with leather for closing the holes the more exactly: and the bucket G is raised and depressed alternately by the handle E and rod D*d*, the bucket being supposed at B before the working begins.

Take hold of the handle E, and thereby draw up the bucket from B to C, which will make room for the air in the pump all the way below the bucket to dilate itself, by which its spring is weakened, and then its force is not equivalent to the weight or pressure of the outward air upon the water in the vessel K: and, therefore, at the first stroke, the outward air will press up the water through the notched foot A, into the lower pipe, about as far as *e*: this will condense the rarefied air in the pipe between *e* and C to the same state it was in before; and then, as its spring within the pipe is equal to the force or pressure of the outward air, the water will rise no higher by the first stroke; and the valve *b*, which was raised a little by the dilatation of the air in the pipe, will fall, and stop the hole in the box H; and the surface of the water will stand at *e*. Then depress the piston or bucket from C to B, and as the air in the part B cannot get back again through the valve *b*, it will (as the bucket descends) raise the valve *a*, and so make its way through the upper part of the barrel *d* into the open air. But upon raising the bucket G a second time, the air between it and the water in the lower pipe at *e* will be again left at liberty to fill a larger space; and so its spring being again weakened, the pressure of the outward air on the water in the vessel K will force more water up into the lower pipe from *e* to *f*; and when the bucket is at its greatest height C, the lower valve *b* will fall, and stop the hole in the box H, as before. At the next stroke of the bucket or piston, the water will rise through the box H towards B, and then the valve *b*, which was raised by it, will fall when the bucket G is at its greatest height. Upon depressing the bucket again, the water cannot be pushed back through the valve *b*, which keeps close upon the hole whilst the piston descends. And upon raising the piston again, the outward pressure of the air will force the water up through H, where it will raise the valve, and follow the bucket to C. Upon the next depression of the bucket G, it will go down into the water in the barrel B; and as the water cannot be driven back through the now, close valve *b*, it will raise the valve *a* as the bucket descends, and will be lifted up by the bucket when it is next raised. And now, the whole space below the bucket being full, the water above it cannot sink when it is next depressed; but upon its depression, the valve *a* will rise to let the bucket go down; and when it is quite down, the valve *a* will fall by its weight, and stop the hole in the bucket. When the bucket is next raised, all the water above it will be lifted up, and begin to run off by the pipe F. And thus, by raising and depressing the bucket alternately, there is still more water raised by it; which getting above the pipe F, into the wide top I, will supply the pipe, and make it run with a continued stream.

So, at every time the bucket is raised, the valve *b* rises, and the valve *a* falls; and at every time the bucket is depressed, the valve *b* falls, and *a* rises.

As it is the pressure of the air or atmosphere which causes the water to rise, and follow the piston or bucket G as it is drawn up: and since a column of water 32 feet high is of equal weight with as thick a column of the atmosphere, from

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from the earth to the very top of the air; therefore the perpendicular height of the piston or bucket from the surface of the water in the well must always be less than 32 feet; otherwise the water will never get above the bucket. But when the height is less, the pressure of the atmosphere will be greater than the weight of the water in the pump, and will therefore raise it above the bucket: and when the water has once got above the bucket, it may be lifted by it to any height, if the rod D be made long enough, and a sufficient degree of strength be employed, to raise it with the weight of the water above the bucket, without ever lengthening the stroke.

The force required to work a pump, will be as the height to which the water is raised, and as the square of the diameter of the pump-bore, in that part where the piston works. So that, if two pumps be of equal heights, and one of them be twice as wide in the bore as the other, the widest will raise four times as much water as the narrowest; and will therefore require four times as much strength to work it.

The wideness or narrowness of the pump, in any other part besides that in which the piston works, does not make the pump either more or less difficult to work; except what difference may arise from the friction of the water in the bore, which is always greater in a narrow bore than in a wide one, because of the great velocity of the water.

The pump-rod is never raised directly by such a handle as E at the top, but by means of a lever, whose longer arm (at the end of which the power is applied) generally exceeds the length of the shorter arm five or six times; and, by that means, gives five or six times as much advantage to the power. Upon these principles, it will be easy to find the dimensions of a pump that shall work with a given force, and draw water from any given depth.

The quantity of water raised by each stroke of the pump-handle, is just as much as fills that part of the bore in which the piston works, be the size of the rest of the bore above and below the piston what it will. The pressure of the atmosphere will raise the water 32 feet in a pipe exhausted of air; but it is advisable never to have the piston more than 20 or 24 feet above the level of the surface of the water in which the lower end of the pump is placed: and the power required to work the pump will be the same, whether the piston goes down to be on a level with the surface of the well, or whether it works 30 feet above that surface; because the weight of the column of air that the piston lifts, is equal to the weight or pressure of the column of water raised by the pressure of the air to the piston. And although the pressure of the air on the surface of the well will not raise or force up the water in the pump-bore more than 32 feet, yet when the piston goes down into the column so raised, the water gets above it, and may then be raised to any height whatever, above the piston, according to the quantity of power applied to the handle of the pump for that purpose.

Pumps ought to be made so (says Mr. Ferguson) as to work with equal ease in raising the water to any given height above the surface of the well. And this may be done by duly proportioning the diameter of the bore (in that part where the piston works) to the height the water is to be raised, as that the column of water may be no heavier in a long pump than a short one; or indeed equally heavy in all pumps from the shortest to the longest, on a supposition that the diameter of the bore is of the same size from top to bottom: and whatever the size of the bore be, above or below that part in which the piston works, the power required to work the pump will be just the same as if the bore was of the same size throughout.

In order that a man of common strength may raise water by pumps with the same ease, to any height not less than 10 feet, or more than 100 feet, above the surface of the well, Mr. Ferguson has calculated the annexed table, in which the diameter of the bore is duly proportioned to the height; and in these calculations he supposes the pump handle to be a lever increasing the power five times.

Height of the Pump, in Feet, above the Surface of the Well.	Diameter of the Bore.		Water discharged in a Minute, in Wine Measure.	
	Inches.	100 Parts of an Inch.	Gallons.	Pints.
10	6	.93	81	6
15	5	.66	54	4
20	4	.90	40	7
25	4	.38	32	6
30	4	.00	27	2
35	3	.70	23	3
40	3	.46	20	3
45	3	.27	18	1
50	3	.10	16	3
55	2	.95	14	7
60	2	.84	13	5
65	2	.72	12	4
70	2	.62	11	5
75	2	.53	10	7
80	2	.45	10	2
85	2	.38	9	5
90	2	.31	9	1
95	2	.25	8	5
100	2	.19	8	1

In the first column, look for the number of feet the water is to be raised; then, in the second column you have the diameter of that part of the bore in which the piston or bucket works; and in the third column, the quantity of water which a man of ordinary strength can raise in a minute by the pump to the given height.

The quantity of water contained in a pipe of either of those heights in the table, supposing the diameter of the bore to be the same from top to bottom of the pipe, is 4523.2 cubic inches, or 19.58 gallons in wine measure, as near as the hundredth part of an inch in the diameter of the bore can make it.

Mr. Ferguson has calculated the following table, by which the quantity and weight of water in a cylindrical bore of any given diameter and perpendicular height may be very readily found.

Diameter of the cylindrical Bore one Inch.			
Feet high.	Quantity of Water in cubic Inches.	Weight of Water in Troy Ounces.	In Avoirdupois Ounces.
1	9.4247781	4.9712340	5.4541539
2	18.8495562	9.9424680	10.9083078
3	28.2743343	14.9137020	16.3624617
4	37.6991124	19.8849360	21.8166156
5	47.1238905	24.8561700	27.2707695
6	56.5486686	29.8274040	32.7249234
7	65.9734467	34.7986380	38.1790773
8	75.3982248	39.7698720	43.6332312
9	84.8230029	44.7411060	49.0873851

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For tens of feet high, remove the decimal points one place towards the right hand; for hundreds of feet, two places; for thousands, three places; and so on. Then multiply each sum by the square of the diameter of the given bore, and the products will be the answer.

Example.

Qu. *What is the quantity and weight of water in an upright pipe 85 feet high, and 10 inches in diameter of bore? The square of 10 is 100.*

Feet high.	Cubic Inches.	Troy Ounces.	Avoirdupois Ounces.
80	753.982248	397.698720	436.332312
5	47.1238905	24.8561700	27.2707695
85	801.1061385	422.5548900	463.6030815
Multiply by	100	100	100
Anf.	80110.6138500	42255.4890000	46360.3081500

Which number (80110.61) of cubic inches being divided by 231, the number of cubic inches in a wine gallon, gives 342.6 for the number of gallons in the pipe: and 42255.489 troy ounces being divided by 12, gives 3521.29 for the weight of the water in troy pounds: and lastly, 46360.3 avoirdupois ounces being divided by 16, gives 2897.5 for the weight in avoirdupois pounds.

The power required to work a pump, or any other hydraulic engine, must not only be equal to the weight of the whole column of water in the pump bore, but as much superior to it as will overcome all the friction of the working parts of the engine.

PUMP, the Forcing, raises water through the box H (*fig. 5.*) not in the same manner as the sucking-pump does, when the plunger or piston *g* is lifted up by the rod *Dd*. But this plunger or forcer (see **FORCER**) has no hole through it, to let the water in the barrel *BC* get above it, when it is depressed to *B*; and the valve *b* (which rose by the ascent of the water through the box *H* when the plunger *g* was drawn up) falls down and stops the hole in *H*, the moment that the plunger is raised to its greatest height. Therefore, as the water between the plunger *g* and box *H* can neither get through the plunger upon its descent, nor back again into the lower part of the pump *Lc*, but has a free passage by the cavity around *H* into the pipe *MM*, which opens into the air-vessel *KK* at *P*; the water is forced through the pipe *MM* by the descent of the plunger, and driven into the air-vessel; and in running up through the pipe at *P*, it opens the valve *a*; which shuts at the moment the plunger begins to be raised, because the action of the water against the under side of the valve then ceases.

The water being thus forced into the air-vessel *KK* by repeated strokes of the plunger, gets above the lower end of the pipe *GHI*, and then begins to condense the air in the vessel *KK*. For as the pipe *GH* is fixed air-tight into the vessel below *F*, and the air has no way to get out of the vessel but through the mouth of the pipe at *I*, and cannot get out when the mouth *I* is covered with water, and is more and more condensed as the water rises upon the pipe, the air then begins to act forcibly by its spring against the surface of the water at *H*: and this action drives the water up through the pipe *IHG*, from whence it spouts in a jet *S* to a great height; and

is supplied by alternately raising and depressing of the plunger *g*, which constantly forces the water that it raises through the valve *H*, along the pipe *MM*, into the air-vessel *KK*.

The higher the surface of the water *H* is raised in the air-vessel, the less space will the air be condensed into, which before filled that vessel; and therefore the force of its spring will be so much the stronger upon the water, and will drive it with the greater force through the pipe at *F*: and as the spring of the air continues whilst the plunger *g* is rising, the stream or jet *S* will be uniform, as long as the action of the plunger continues: and when the valve *b* opens, to let the water follow the plunger upward, the valve *a* shuts, to hinder the water, which is forced into the air-vessel, from running back by the pipe *MM* into the barrel of the pump.

If there was no air-vessel to this engine, the pipe *GHI* would be joined to the pipe *MMN* at *P*; and then the jet *S* would stop every time the plunger is raised, and run only when the plunger is depressed.

Mr. Newsham's water engine, for extinguishing fire (see **FIRE-Engine**), consists of two forcing-pumps, which alternately drive water into a close vessel of air; and by forcing the water into that vessel, the air in it is thereby condensed, and compresses the water so strongly, that it rushes out with great impetuosity and force through a pipe that comes down into it; and makes a continued uniform stream by the condensation of the air upon its surface in the vessel.

By means of forcing-pumps, water may be raised to any height above the level of a river or spring; and machines may be contrived to work these pumps, either by a running stream, a fall of water, by horses, or by steam. See **WATER Works**.

The rod of the bucket in a sucking-pump is sometimes made to work through a collar of oiled leathers and brass plates connected with the barrel of the pump by screws, and kept moist by water contained in a vessel at the top: it prevents the water issuing from the top of the pump, and therefore, by a pipe, it will rise to any height. This is called in the North, a *jack-head*. Defaguliers's Exp. Phil. vol. ii. p. 152, &c. Ferguson's Lectures, p. 73, &c. 4to.

PUMP, the Lifting, differs from the sucking-pump only in the disposition of its valves, and the form of its piston frame. This kind of pump is represented in *fig. 6.* *AB* is a barrel fixed in a frame *IKLM*, which is immoveable, with its lower part communicating with the water. *GEQHO* is a frame with two strong iron rods, moveable through holes in the upper and lower parts of the pumps *IK* and *LM*; in the bottom of this frame *OQH*, is fixed an inverted piston *BD*, with its bucket and valve upon the top at *D*. Upon the top of the barrel there goes off a part *FR*, either fixed to the barrel, or moveable by a ball and socket; but in either case water and air-tight. In this part, at *C*, is fixed a valve opening upwards. It is evident, that when the piston frame is thrust down into the water, the piston *D* descends, and the water below will rush up through the valve *D*, and get above the piston; and that, when the frame is lifted up, the piston will force the water through the valve *C* up into the cistern *P*, there to run off by the spout. The piston of this pump plays below the surface of the water. Mr. Martin has described a mercurial pump, which works by quicksilver, invented by Mr. Hofkins, and perfected by Defaguliers; and another pump of the lifting sort, invented by Messrs. Gosset and De la Denille, and set up in the king of France's garden at Paris, the piston

of which works without friction. Phil. Brit. vol. ii. p. 57, &c. ed. 3.

PUMP, *Ctesebes's*, the first of all the kinds, acts both by suction and pulsion. Its structure and action are as follow: —A brass cylinder A B C D (*fig. 7.*), furnished with a valve in L, is placed in the water. 2. In this is fitted the embolus M K, made of green wood, which will not swell in the water, and adjusted to the aperture of the cylinder with a covering of leather, but without any valve. In H is fitted on another tube N H, with a valve that opens upwards in I.

Now, the embolus E K being raised, the water opens the valve in L, and rises into the cavity of the cylinder: and when the same embolus is again depressed, the valve I is opened, and the water driven up through the tube H N.

This is the pump used among the ancients, and that from which both the others are deduced. Sir S. Morland has endeavoured to increase its force by lessening the friction; which he has done to good effect, inasmuch as to make it work without almost any friction at all.

PUMPS for draining *Mines* are worked by horses, or water, but more than either by the steam-engine, which, had it produced no other advantage than the facilities it offers in mining, would have been of more real value than any philosophical discovery ever made. The pumps for this purpose are generally sucking-pumps of the common construction, made of cast-iron, except that they have an opening at the lower part of the barrel, to give access to the valve or bucket when they require repair or renewal of the leathers, and this is closed by a door or lid, fastened on with screws. The pump rod is suspended by chains from the arched end of a lever situated over the pit, and put in motion by the piston of the steam-engine acting at the opposite end, or by a crank turned from a horse-wheel or water-wheel. When the depth is considerable, the pit is divided into two or three lifts, and as many different pumps used; the lowest to raise the water from the bottom of the mine into a cistern at the first lift, in which the second pump stands, and raises the water to a second cistern, from which the third or upper pump raises it to the surface, or to the level or subterranean passage, at which it can run off to some lower land than that on which the engine is erected. The rods of the three pumps are brought into one by bolting them together at the top, and are suspended from the beam or lever, as before-mentioned. They are made of wood, the lengths being united together by iron joints; but even these in deep mines are of such great weight as to require a second beam or lever, placed on the opposite side of the pit to the engine, and having a balance weight at the outer end; because it would be too great a weight for any beam to bear, if a sufficient balance were put upon the opposite end of the same working beam that bears the strain of working the pumps: if they are of light wood, a considerable portion of their weight is taken off, by their being immersed in the water which the pumps contain.

A plan which is common in the mines of Cornwall, obviates the necessity of thus balancing the pump rods; it is by employing forcing-pumps instead of lift or suction-pumps. In these the engine is employed to lift the weight of the rods, and their descent is the power that raises the water in the pump, by pressing down the piston or forcer, and expelling the water from the barrel at the bottom through a valve into a pipe, which ascends the pit. The construction of the pump is varied from that in common use, though its principle is the same. Instead of the barrel

being bored correctly within, and fitted with the leathered forcer, the forcer is made rather longer than the stroke of the pump, and being made true and smooth on the outside, it is fitted in a collar of leather at the top of the barrel of the pump. By this means, when the piston is raised up and down, it increases and diminishes the capacity of the barrel, which being provided with valves at the bottom and at the foot of the pipe, it will raise or force up the water, in the same manner as the force-pump before described.

The suction-pumps before mentioned, used in mining, are always made of cast-iron, in lengths of six or eight feet, screwed together at the flanches, forming a long tube, which is called the pile or pillar of pumps.

The working barrel of each lift of pumps, or that length of pipe in which the bucket moves, is usually fourteen to twenty feet above the bottom, and has at its upper end a wider part, and a cover, which, like that above-mentioned, takes off by screws to new leather, or to repair the bucket. The bottom length of mine-pumps is called the wind-bore, usually enlarged at two or three feet from the bottom, and diminishing thence to a point like that of an egg, which part is full of rows of holes three quarters or an inch in diameter. The upper row of these holes is plugged up with deal plugs, which the miners can open or stop as the water increases, or otherwise, and according to the going of the engine. When a pit or mine is first sinking, it becomes necessary to contrive the means of drawing the water completely from the bottom, that they may not have to stand in the water to work, which, besides its inconvenience, prevents them using gunpowder if the bottom is rocky. Sometimes, instead of the plugs of wood, the holes of the wind-bore are surrounded by a circular apron of strong leather, made fast and tight above to the pipe; which apron the miners can from time to time turn up or down like the cuff of a coat, so as to regulate the access of water, and prevent, as much as possible, the drawing of air by the pumps, as this deranges the motion of the engine. In sinking pits, the lower lift of pumps should stand in the deepest hole which has been made in the bottom of the pit, and for this purpose, when a new hole has been made, either by picking, or blasting, near to the pumps, they are levered towards, and let to sink into such new hole. In long lifts and heavy pumps, this lowest and moveable length of the pump is wholly or in part suspended by strong ropes attached to the great windlafs, which is, in all such cases, provided near the shaft for drawing the pump rods, or the pumps themselves, in cases of need. As the shaft is deepened, new lengths of pump barrels are added at the top of the lower lift, generally about a yard at a time, and the pump rods are lengthened as the pump requires. This, which is the common mode of working in sinking pits, has many inconveniences: 1. As it is necessary for the pumps, whilst sinking, to keep the water very low in the pit, the engine frequently goes too fast, in consequence of the pump drawing up air, and carries up by the violence of the current small pieces of stone, coal, or other substances, and lodges them above the bucket upon the valves, which must considerably retard the working of the pump, and wear the leather. 2. When the engine is set to work, (after having been stopped whilst working upon air, and consequently a quantity of air remaining in the pump-barrel, with the small stones, &c. deposited on the valves of the bucket,) it often happens that the compression of the air by the descent of the bucket, is not sufficient to overcome the weight of the bucket valves so loaded with rubbish, and the column of water in the stand-pipes: the pump is hereby prevented from catching

catching its water. The usual remedy for this is to draw the bucket out of the working barrel, until a quantity of water has escaped by its sides to displace the air: this evil often arises from the unnecessary magnitude of the space between the bucket and clack. 3. The pumps being suspended in the pit by capstan ropes for the purpose of being readily lowered as the pit is sunk, the stretching of the ropes, (especially when sinking in soft strata,) occasions much trouble, by suffering the pumps to rest on the bottom and choke; but the most serious evil is, that the miners, in shifting the pump from one place to another, that they may dig in all parts of the pit, throw them very far out of the perpendicular, thereby causing immense friction and wearing in all parts, besides endangering the whole apparatus, by breaking the bolts and stays, and straining the joints of the pipes.

Mr. William Brunton, of Butterly iron-works in Derbyshire, has presented to the Society of Arts an improved pump for mining, which obviates all the above difficulties. To avoid the pump drawing air, he has introduced a side pipe, connecting the parts of the working barrel which are above and below the bucket, which pipe has a stop-valve, that the miner can regulate with the greatest ease, so as to keep the engine to its full stroke, without drawing air, by letting down the water from the upper part of the barrel into the lower, so that it is working again in its own water. Instead of having the whole weight of the lower lift of pumps standing on the bottom, it is fixed in the pit by cross beams, and the miner has only to lift and move an additional pipe or wind-bore, which slides upon the lower length of the pump like a telescope, to lengthen down, and this additional wind-bore is besides crooked, and turned aside like a short crank, which, by the facility with which it turns round in the leathered collar above the nose of it, can easily be removed into every fresh hole which is made in the bottom by the miners. The pumps are supported in the pit by beams placed across at proper distances, so as to suit the lengths of the pipes, or lengths of the pump, which are nine feet. Short pieces are laid across these, with half circular holes in them, which being put round the pump, just beneath the flanches, firmly sustain its weight, but may quickly be removed when it is required to lower the pumps in the pit; and as they are not fastened by any bolt, they do not prevent the pumps being drawn upwards, if it becomes necessary to take out the pumps when the pit is full of water. The pumps by these means remain stationary and the suction-pipe lengthens as the pit is sunk, until it is drawn out to its full extent; the whole column is then lowered to the next flanches, and another pipe is added to the top. The pumps being thus kept stationary till nine feet are sunk, the pipe at the top will of course deliver the water at the same level at all times, and instead of being obliged to lengthen the column every yard sunk, it will only be necessary every nine feet.

Fig. 4. of Plate XV. Hydraulics, explains the construction of Mr. Brunton's pump, being a section through the centre of the working barrel and suction piece. A is the door which unscrews to get at the clack of the pump; B is the working barrel, with the bucket D working in it; E is the clack, also shewn enlarged in *figs. 5 and 6*; F is the suction-pipe, and G G a moveable lengthening piece: this slides over, and includes the other when the pump is first fixed; but as the pit is sunk, it slides down over the pipe F, to reach the bottom. The outside of the inner pipe, F, is turned truly cylindrical and smooth, and the inside of the outer pipe G, at the upper end, for about six inches down, is made to fit it. The junction is made perfect, by leathers being placed in the bottom of the cup *aa*, which holds water and wet clay over

them, to keep them wet and pliable, and consequently air-tight. The lower extremity of the suction-pipe G terminates in a nose R, pierced with a number of small holes, that it may not take up dirt. This nose is not placed in a line with the pipe, but curved to one side of it, like a crank, so as to describe a circle when turned round. By this means the miners, by turning it round upon the pipe F, can always place the nose R in the deepest part of the pit; and when they dig or blast a deeper part, they turn the nose about into it, the sliding tube lengthening down to reach the bottom of the hole, as shewn in the figure. By this means there is never a necessity to set a shot for blasting, so near the pump-foot as to put it in any danger of being injured by the explosion, as is the case in the common pump, in which this danger can only be avoided by moving the pump-foot to one side of the pit, which necessarily throws the whole column of pumps out of the perpendicular.

The construction of the clack is explained by *figs. 5 and 6*, the former being a section, and the latter a plan. L L is a cast-iron ring, fitting into a conical seat in the bottom of the chamber of the pump, as shewn in *fig. 4*; it has two stems, *l, l*, rising from it, to support a second iron ring M M; just beneath this, a bar, *m*, extends across from one stem to another, and has two screws tapped through it; these press down a second cross-bar *n*, which holds the leather of the valves down upon the cross-bar of the ring L, and this makes it fast, forming the hinge on which the double valves open, without the necessity of making any holes through the leather, as is common: but the chief advantage is, that by this means the clack can be repaired, and a new leather put in, with far less loss of time than at present, an object of the greatest importance; for in many situations the water gathers so fast in the pit, that if the clack fails, and cannot be quickly repaired, the water rises above the clack door, so as to prevent any access to it, and there is no remedy in the common pump but drawing up the whole pile of pumps, which is a most tedious and expensive operation. In Mr. Brunton's pump, the clack can at any time be drawn out of it, by first drawing out the bucket, and letting down an iron prong Z, which has hooks on the outside of its two points: this, when dropped down, will fall into the ring M, and its prongs springing out will catch the under side, and hold it fast enough to draw it up. Another part of Mr. Brunton's improvement consists in the addition of a pipe H, (*fig. 4.*) which is cast at the same time with the barrel, and communicates with it at the top and bottom, just above the clack: at the upper end the pipe is covered by a flat sliding plate, which can be moved by a small rod *b*, passing through a collar of leather; the rod has a communication by a lever, so that the valve can be opened or shut by the men in the bottom of the pit. The object of this side pipe is to let down such a proportion of the water which the pump draws, as will prevent it drawing air, though, of course, the motion of the engine will be so adapted as not to require a great proportion of the water to be thus returned through the side pipe, yet it will not be possible to work the engine so correctly as not to draw some without this contrivance, and if it does, it draws up much dirt and pieces of stone into the pump, besides causing the engine to work very irregular, in consequence of partially losing its load every time the air enters the pump. Another use of the side pipe is to let down water into the chamber of the clack to fill it, when the engine is first set to work, after the pumps have been standing still, and the lower part of the barrel and chamber empty.

Figs. 7 and 8, of Plate XV. are a section and elevation of a three-barrelled force-pump, of a very good construction,

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construction, which was used by Mr. Smeaton in the numerous water-engines which he erected at London bridge, Stratford, and other places for the supply of towns with water. It has the advantage of the valves being very accessible, and the water-way may be kept to the full size of the barrel without contractions, which, as they occasion great resistance to the motion of the water, are a waste of power. It acts on the same principle as the ordinary forcing-pump, only that three barrels are connected together, for the advantage of raising a constant stream of water. *A, A,* are the barrels, which are bored out truly cylindrical. If the pump is small, the barrels are usually made of brass, but for larger work cast iron is used. From one side, near the bottom of each, proceeds a curved pipe *B*, turning up, and ending with a flaunch, to screw to the under side of the forcing chamber *L*. There is also, near the bottom, at the opposite side of the barrel, a projecting neck or short pipe, *D*, covered at the end by a door screwed on, that it may be removed to give access to the valve, *m*, in the bottom of the barrel. The barrels have projecting rings or flaunches, by which they are screwed down upon the suction chamber *H*, which is common to all three barrels; it has a pipe from each of its ends terminating in a flaunch *b*, to screw on the pipes which bring water to the pump. The upper flaunch, or top of the suction chamber *H*, has three holes in it, one under each barrel, and each is covered by a valve shutting downwards, as is shewn in the section, *fig. 7*. These valves are made of iron, to shut down upon hinges like a door, and are covered with leather at the lower side. Mr. Smeaton made his valves with the centre pin of the hinge removed backwards from the hole which the valve covers, and it is also raised above the surface of the under side of the valve, by which means the valve opens in some degree on that side where the hinge is, as well as on the other, and any obstruction getting into the valve, will be less liable to be detained, and will not have such a great leverage to break the hinge of the valve when the force of the water shuts it down, as it would if the hinge was on a level, and close to the edge of the hole, because the obstacle will not be so near the centre. The hinge is fastened to the pump by a screw, *w*, passing through the metal, and screwing into the hinge; this being withdrawn, and the door, *D*, opened, the valve is quite loose, and may be taken out to renew the leather. To give facility to this, the doors, *D*, are made oval, as shewn in *fig. 8*. Another similar valve, *n*, is fitted at the top of each of the pipes, *B*, to cover their apertures; they are all covered by a common forcing chamber, *L*, which is exactly similar to the suction chamber, except that it has nozzles, *R*, in the top over each valve, and covered with doors to give access to them. The conducting pipes are carried away from either end of the forcing chamber, flaunches being provided to unite them. Each barrel is fitted with a piston or forcer *M*, which consists of three metallic plates, secured to the rod: the middle plate is turned true, and fitted as accurately as possible to the barrel; the upper and lower plates are somewhat smaller. Two round pieces of leather, larger than the barrel, are placed above and below the middle plate, being held fast between it and the upper and lower plates. When forced into the barrels, these leathers turn up and down round the upper and lower plates, forming two cups of leather, which accurately fit the barrel, and will not permit any fluid to pass by them. The parts of the pump are fastened together by screws and nuts, as will be understood by inspection of the figures. The whole pump is supported on two ground-cills, and by means of two iron flaunches of the suction chamber, *H*, the whole pump is bolted down upon the ground-cills. The action of this pump is simply

this; when the piston or forcer of one barrel is raised, it causes a vacuum in it, and the pressure of the atmosphere forces the water up the suction pipe *H*, (if not more than 30 or 33 feet,) opens the valve, *m*, in the bottom of the barrel, and fills it with water: on the descent of the forcer the lower valve shuts, and the forcing valve, *n*, opens by the water the barrel contained being driven through it into the forcing chamber, *L*, and thence to any place whither the forcing-pipe is carried. On the re-ascent of the forcer, the lower valve, *m*, opens, and the shutting of the forcing valve, *n*, prevents the water returning into the barrel. The three forcers work up and down alternately, so that while one barrel is sending water up the force pipe, the others are lifting it up the suction pipe, and the third continues the action in the interval, when the change of motion takes place between the two. In this manner, the pump will raise a very constant stream of water, if the forcers are worked in a proper manner, which is best done by means of cranks, placed at such an angle to each other, upon the same axis, that they will act in due succession.

PUMPS for Ships.—Among the perils of a sea-faring life, a leaking ship may be reckoned the most dreadful and fatal of all others: here not only one man, or a few men, perish, but every living creature on board. When a ship strikes against a rock, and is wrecked, some lives may be saved by floating planks and rigging; if the magazine takes fire, death comes instantaneously, and kills, perhaps, in the most gentle manner; but in the desperate case of a leak, how slowly does the awful monarch advance, attended by all the terrors of anxious suspense.

In such a melancholy situation, all their hopes and expectations for help and safety must be placed in the pumps, and this consideration renders those machines of vast estimation and consequence; it highly imports every commander of a ship (to whom the lives of his men are committed) to take the utmost care that his ship be supplied with such pumps as will best provide against, and ward off, these impending dangers. By any negligence in this respect, he may become guilty of destroying his own life, the lives of his men, and of the ruin and misery of many families; it therefore becomes his duty to be furnished with the best pump that can be procured for evacuating the hold from the water that may, at any time, get in, with the least force, and in the shortest time.

At different times, almost every description of pump has been employed in ship service; but custom has at length decided in favour of the chain-pump, although, from the friction naturally attending its construction, it takes somewhat more power to raise a certain quantity of water than some other kind of pump when well made. Yet on the whole, from being so little liable to choke up or be deranged by violent use, it has gained the preference with the seamen. Constant attempts have been made to produce a pump that would raise a greater quantity of water than the chain-pump with the same power, and still to preserve the other advantages of that machine.

These inventions have been offered to the public one after another, with pompous recommendations by their respective projectors, who have never failed to report their effects as considerably superior to that of other pumps with which they have been tried. It is, however, much to be regretted, that in these sorts of trials there is not always a scrupulous attention to what may be called mechanical justice. The artist who wishes to introduce a new piece of mechanism, has generally sufficient address to compare its effects with one of the former machines which is crazy, or out of repair: a report of this kind, indeed, favours strongly

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of the evidence of a false witness; but this finess is not always discovered. The persons appointed to superintend the comparative effect of the different pumps, have not always a competent knowledge of hydraulics to detect these artifices, or to remark, with precision, the defects and advantages of those machines, as opposed to each other. Thus, the several inventions proposed to supplant the chain-pumps which are now generally used in the British navy, have hitherto proved ineffectual, and are no longer remembered.

In many instances, for want of a proper knowledge of mechanics and hydraulics, these inventions have proceeded upon a mistaken principle, supposing it possible to make some contrivance or other, by which a pump should raise more water with a certain power than has ever been done before. This is a mistaken idea, for pumps, in point of the quantity of water they will raise, have long ago been brought to as great a degree of perfection as it is perhaps possible; and to raise a greater weight of water than the power applied is equal to, is an impossibility, as no power or effort can really be increased by any kind of machinery, it can only be modified; and what is gained in the magnitude of the effect the machine produces, is lost in the time expended to accomplish it: in truth, rather more is lost, because of the friction of the machine, and the power expended in working its parts; we should, therefore, ascertain the quantity of water that can be raised in a given time by the force of one or more men, without deductions for friction; and when a ship's, or other pump is to be considered, if its produce comes near to this standard, we should be satisfied as to its performance, and look for improvements in the conveniences of its construction.

Desaguliers, in the second volume of his *Experimental Philosophy*, has taken much pains to find out an average of the quantity of water which can be raised in a given time by any number of men; and this will serve to guide us in these pursuits, and to enable us to value the pretensions of projectors in the art of raising water. He found, that the mean strength of a man, when applied to the best kind of pump that had been in his time in use, amounts to no more than the raising of one hoghead of water in a minute, to the height of ten feet. Mr. Smeaton says, he made a variety of machines, and many observations of this kind, but never found the value of men's strength at a medium quite equal to what is set down by Desaguliers, unless they are supposed to work in haste or distress for a few minutes.

The improvements which are desirable in pumps for a ship's use, are, 1st, that as little power as possible should be lost in friction and resistance of the water passing through the valves and pipes; 2dly, that no water be lost by leakage, and that the pump be not liable to choke up by chips or other extraneous matters getting into the pump; 3dly, it should not be obliged to raise its water to a greater height than is necessary for it to run off, namely, to the load-water line of a ship; lastly, that it should be so adapted, that the united efforts of a great number of men can be applied, without any of them working to a disadvantage. The pumps which are at present in use in the navy are of two kinds, the chain-pump, and the hand-pump; the chief dependence of pumping the ship, in emergency, being placed upon the former, the latter being used in ordinary occasions, to clear the hold from that trifling leakage which would injure the cargo, though it puts the ship in no danger.

English ships of war carry four chain-pumps and three hand-pumps, all being fixed in the same well, which also includes the main-mast. (See *Plates IV. and VI. of Naval*

Architecture.) One of the hand-pumps is called the wash-deck pump, being used to raise water from a cistern in the hold to the upper deck, for washing the ship; but in emergency, it assists to pump the ship. The chain-pump (*Plate XIV. fig. 8.*) is no other than a long chain, A, with a sufficient number of pistons, *a*, called buckets or saucers, fixed upon it at proper distances: it passes downwards through a wooden tube, B, and returns upwards, in the same manner, on the other side, D; the ends being united together. The chain is extended over two wheels, E and F, called sprocket wheels: one is placed over the tubes, B and D, of the pump, and the other at the bottom, in the space between the two tubes through which the chain ascends and descends. By turning the upper wheel, E, the chain of buckets is put in motion; and the lower part of the wooden tube, in which the chain ascends, is lined with a brass barrel, in which the saucers are fitted. As they are continually ascending in this tube, they raise a constant stream of water, which runs off from the top of the ascending trunk, and is carried by a trunk through the ship's side into the sea. The pump is worked by a crank, or winch, G, fixed on the axis of the upper wheel, whereon several men may be employed at once; and thus it discharges, in a limited time, a much greater quantity of water than the common pump, and that with less inconvenience to the labourers.

The chain-pump now in use in the navy is of a very improved construction, compared with original chain-pumps. It was introduced by Mr. Cole, under the direction of captain Bentinek. The chain of this machine is simple, and not much exposed to damage. It is exactly similar to that of the fire-engine, and appears to have been first applied to the pump by Mr. Mylne, to exhaust the water from the caissons at Blackfriars bridge. It has thence been transferred to the marine by captain Bentinek, after having received some material additions to answer that service. The links of the chain (*fig. 9.*) are each formed of two long plates of iron, *e, e*, with a hole at each end, and fixed together by two bolts, serving as pins for the joints. The buckets or saucers fixed upon it are two circular plates of brass, *g*, with a piece of leather between them. The sprocket wheels for the chain are formed in the same manner as the trundles used in mills, by two iron wheels fixed at eight inches distance upon the axle, and united by several round iron bolts, forming a rest for the chain; and its links have hooks, *b*, which are taken by these bolts; and thus the chain is secured upon the wheel, to prevent it from jerking back, when charged with a column of water.

This pump was a great improvement upon the old chain-pumps, used in ships before, in which the chain was of too complicated a fabric, and the sprocket wheels used to work it were deficient, in wanting some contrivance to prevent the chain from sliding or jerking back upon the surface of the wheel, which frequently happened when the buckets were charged with a considerable weight of water, or when the pumps were violently worked. The links were too short, and the awkward manner in which they were connected exposed them to a great friction in passing round the wheels: hence they were sometimes apt to break, or burst asunder, in very dangerous situations, when it was extremely difficult or impracticable to repair the chain. Mr. Cole's pump is so constructed, that the chain may be easily taken up and repaired, when broken, or choaked with ballast; and it discharges a much greater quantity of water with an inferior number of men, as appears from a trial of this machine with the old chain-pump aboard the *Seaford* frigate; where it was found that its effects, when compared with the latter, were as follows: the new pump with four men

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men raised one ton of water in $43\frac{1}{2}$ seconds, while the old pump required seven men to raise the same quantity of water in 76 seconds. In this experiment, the chain of the new pump was purposely broken, and dropped into the well, and afterwards taken up and repaired, and set to work again in two minutes and a half: then the lower wheel of the pump was taken up, to shew how readily it might be cleared and refitted for action, after being choaked with sand or gravel, which could be performed in four or five minutes. These are advantages which, with a seaman, have a superior consideration to that of increasing the quantity of water which the machine will raise, unless it was in a considerable degree; and indeed the very best pumps will not raise a much greater proportion with the same power. The only alteration which has been made on Mr. Cole's pump, since its first introduction near 30 years ago, is that they now omit the lower sprocket wheel altogether, the ascending and descending pipes being so united by a curved metal tube, that the chain passes better than if a wheel was used. The cranks are made to take off, and apply when wanted, that they may not be in the way: they are long enough for 30 men to work at once. Of late it has been proposed to add fly-wheels to them: this would be attended with but slight advantage, and several inconveniences, from occupying that room where the men should stand to work, it being an object to employ as many as possible; but if they are crowded, they only incommode each other, instead of assisting.

Hand-pumps for ships, are those which act with a barrel and bucket, worked by a lever or brake. Those in common use are sucking-pumps, made in the rudest manner, with a wooden bucket and valves; but several improved constructions have been proposed, and are now adopted in the navy. Mr. Cole made great numbers of hand-pumps, which had brass chambers, or barrels, fitted into the wood where the bucket worked. The valves were made of brass, and fitted into a conical seat, and a door was provided in the lower part of the pump, to give access to the lower valve when requisite; it was closed by a hoop surrounding the pump, and wedged tight. The brake, or lever of the pump, had a cross handle at the end, of sufficient length to allow several men to work together, and on occasion other men could apply their strength, by standing on the deck below, and having a rope descending through the upper deck from the end of the brake.

Mr. Smeaton, in 1765, invented a hand-pump for the sea service, in which, besides the advantage that he expected to obtain from better mechanism and proportion of the parts, he had the following objects in view. The common ship's pump, in general, delivers its water upon the main deck, which, according to the size and construction of the ship, is four, five, or six feet above the surface of the sea, or load-water line, at the same time that this line is not above from 14 to 18 feet above the ship's bottom; it therefore appears that the ordinary pumps lift the water from $\frac{3}{4}$ d to $\frac{1}{4}$ th higher than the level at which the water might be delivered, and thereby require $\frac{3}{4}$ d or $\frac{1}{4}$ th more power to do the same work, or with the same power they do less work than they might do by $\frac{3}{4}$ d or $\frac{1}{4}$ th, in case the water was delivered at or just above the water line. For this purpose he used wooden trunks or pipes, proceeding horizontally from the upright trunk of the pump, to carry off the water through the ship's side, being fitted at the other ends into boxes, or short wooden tubes, let in through the ship's side, and caulked just above the load-water line. These side pipes were closely jointed with the boxes in the ship's side at one end, and at the other end into strong planks, which were bolted against the

sides of the pump, in order that the side pipes might be got out and in without disturbing the pump, which was a sucking-pump, with its bucket worked by a lever or brake, upon the deck over the pump. From the top of the pump a stand pipe was carried up to the main deck, or as high as was thought necessary, to prevent the water reverting and running back into the ship over the top of the pump, when the sea rose above the orifices of the side pipe, or when, from the ship being in distress, they were under her load-water line. By this, even when both boxes and pipes were wholly under water, it would no ways interrupt the action of the pump, for whenever the water in the stand pipe rose above the level of the water without, the pressure of the column in the stand pipe would cause it to make its way through the side pipes, so that in this case no level was lost, and though the pump was at rest no water could revert down the pump, because there were the valves of both bucket and fixed box or clack which prevented it. The working barrel was of brass, and very truly bored, the bucket and fixed box being of the same construction as those used in the steam-engines, and the pump rod was made of greater bulk than was necessary, merely for strength, but by way of weight, that when the brake was lifted up, the pump rod should readily descend by its own weight. The brake of the pump had a branch fixed on, rather obliquely at each side, so as to form three handles, for four men to work at once; they stood one on each side the middle stem of the brake, and one on the outside of each of the branches, and every quarter of an hour they could relieve themselves by changing hands, which was done by changing places. They were intended to make no more than 25 strokes *per* minute, moving the pump rod $17\frac{3}{4}$ inches, up and down, at each stroke, the barrel being a nine-inch bore; this was much better than making shorter strokes and quicker, as they usually do. Their hands moved up and down about four feet six inches, and by working with this stroke at a moderate rate, so as to hold it an hour, four men would in that time deliver 20 tons at a height of 22 feet. This was upon a supposition of raising the water to the usual height, but when by the application of the maxim before described, this perpendicular was shortened to 16 or 17 feet, then nearly the same delivery could be made by three men, or proportionably more by four men, that is, as $17:22::20:26$ tons at 17 feet. The foot of the pump was let through the ship's inner planking or ceiling, betwixt two of the floor timbers, and did not touch the bottom or outside planking, within $2\frac{1}{2}$ inches, the lower end being rounded within like a trumpet mouth, it being a bad plan to have the pump standing upon its lower extremity, with holes bored to let in the water, as it is thus very liable to be choaked by dirt. A plank of the ceiling was made to lift up near the pump's foot, that a man could occasionally get in his arm, to clear away any chips, sand, dirt, or other matter, that should happen to be drawn thither.

Mr. Noble has furnished a great number of hand-pumps for the navy, which have two buckets, working one below the other in the same barrel: they rise and fall alternately, so as to produce a constant stream, like the chain-pump. This is effected by causing the rod for the lower of the two buckets to pass down through the upper bucket in a collar of leathers: the rods of the two buckets are united to the brake or lever, upon opposite sides of its centre or fulcrum, so that the descent of one produces the elevation of the other; thus one is always raising a stream of water, whilst the other is descending for a fresh supply. Such a pump requires no lower valve, unless by way of precaution, in case either bucket should fail, in which case it would become a single pump. The idea is ingenious; but the

complication of the stuffing-box in the upper bucket prevents them being readily taken out, if the pump chokes up, as all ships' pumps are liable to do from chips or loose ballast; and hence it has never been in favour with the seamen, although it acts very well when in order.

The ingenious Benjamin Martin invented a ship's pump with two barrels drawing from one suction-pump, so as to raise a constant stream. This has so much merit, that we have given a section of it in *Plate XV. fig. 9.* Here A is the suction pipe, conducting the water from the ship's hold up to the pump, where it is enlarged, to communicate with both barrels D, D, through the valves C, C, in the bottom; E, E, are the pistons of the barrels, with double valves in them; they are not, like other pistons, fitted to slide in the barrels, but are simply brass rings, in which the valves are fitted, and being smaller than the barrels, have large circular pieces of leather fixed on them, the outside edges of which are attached to the insides of the pump barrels; hence when the pistons are moved up and down, the leather folds sufficiently to admit the motion, as is shewn in the figure; but being close all round, these pistons can have no leakage or friction, and only a small resistance from the stiffness of the leather. To fasten the edges of the leather piston to the barrels, they are made in two lengths, an upper and a lower, and the leather is introduced in the joint between them, being held fast, and the pump kept together by bars, I, I, fixed over the barrels, and bolts to press the upper length of the barrels down upon the lower. Both the barrels are included within a box or cistern, B B, fixed upon the ship's deck, with trunks L, L, which carry off the water as it runs over the tops of the barrels into the cistern. The pump is worked by the piston-rods, H, H, being united by chains to a wheel K, the axle of which is supported by standards from the sides of the cistern B B, and is put in motion by the double lever M, at the ends of which cross handles are fixed for several men to work at once. Mr. Martin's pump acts extremely well; the constant stream raised by the alternate action of the two barrels upon one pipe produces an advantage that was shewn by experiment, for the water not only rises while the piston rises, but continues to do so even after the piston begins to descend; and therefore the pump was found to deliver more water than was expected from calculation of the contents of the barrel, and the number of strokes made.

To account for this, it must be considered that as this pump has both its large pistons working (alternately ascending and descending), at the same time there must be produced a constant rising column of water in the pipe, whose velocity through a bore of five inches, to supply the barrels of twelve inches diameter each, must be so great, that it cannot be checked or stopped at once, or upon the first descent of the piston; and therefore a surplus of water is produced. Notwithstanding these advantages of Mr. Martin's pump, it has objections which are serious obstacles to its use on board ships, though in other situations it is a good machine: these are the shortness of its stroke, which renders it very fatiguing for men to work for a long time; but another more serious objection is, that the leathers would, in general, remain dry, and thus become liable to harden and grow stiff, so as to break into holes when used at first, before they become soaked, and to fill the cistern first with water would be very troublesome.

Mr. Robert Clarke, of Sunderland, has proposed an improvement in the mode of applying men's force to pumping, which is worthy the consideration of seamen. It is to change the posture of standing to sitting, and making the action the

same as that of rowing, which, besides that it is by philosophers considered as the most efficacious application of a man's force, is to seamen most particularly so from their habitual practice of it. He objects to the ordinary action of pumping with a brake, as the posture is weak, and requires much force to preserve it. It oppresses the man by overstretching his loins on one side, and incommodes respiration, by the flexure of the body on the other side. Too much motion of the shoulder-joint is required, as the muscles which act on the arm-bone at this joint are disproportionate to the effort they must make, when the arm vibrates on the shoulder-joint as a centre, for the force to be communicated by the hand. Besides this, the arms themselves are at one instant enfeebled, by being thrown above the head, and requiring a pull, and the next instant require a pushing effort, which changes of direction in the exertion and sustaining force, are too continual and rapid for long continuance; in standing, the body is a continued dead weight upon the legs.

The action of rowing is powerful to a surprising degree, and so well adapted to a man's ease, that he can continue it a greater length of time without fatigue, than any other mode of exertion; for though the motion is large, it is made up of easy motions in several joints; the velocity and resistance of which suit the muscles employed. Very little sustaining force is required, for the body is supported, and returns unloaded to its charge: the breathing is free. The manner of carrying this into effect is very simple, the lever or brake being bent at right angles at a centre pin, so that it hangs straight down when it is at rest, instead of being horizontal; then to the lower extremity a rod is jointed, which is carried rather in an inclined direction upwards to the seamen, who is seated before the pump with a rest for his feet. The rod has a cross handle, to hold by both hands, and in some cases it may be made long enough for two men to sit side by side upon the same seat; and by drawing and pushing it, in the same manner as rowing, the perpendicular lever is caused to vibrate, and the horizontal arm, or bended part, which suspends the pump spear, partakes of the motion sufficiently for pumping.

The latest improvements in hand-pumps, are by Capt. Jekyll, R. N. This gentleman has invented an addition to the pump of an air-vessel, and stuffing-box for the rod to pass through, by which it will raise the water to a greater height than the head of the pump, and a hose being attached to the pump spout, by very simple means, the water is conveyed to any desired part of the ship, and thrown in a jet through a nose pipe with great force, to extinguish fire, if such a calamity should befall a ship, and thus the pump is rendered of twofold service. The idea of converting the pump to a fire-engine is not new, having been attempted in many different ways by forcing-pumps, but these having pipes proceeding from the lower part of the barrels and valves, which are not very accessible, are always liable to choke up by obstructions, and have not succeeded in general use. The air-vessel has always been in the way, if made of a sufficient size, to answer the purpose of equalising the stream. Capt. Jekyll has obviated these objections, and, without altering the material parts of the hand-pump, has rendered it as complete a fire-engine as can be wished. This is explained by *fig. 1. Plate XV.* which is a section of the pump through its whole length. A B C is the iron brake or lever to work it; it is branched at the extreme end, and has a wooden pole, C, fixed in it, for several men to hold at once; D is the iron staunchion or fulcrum of the brake; it is fixed to the pump head by means of strong iron hoops at E E and F F, which at the same time strengthen the work of the pump. The centre pin is to be at a height of two feet

feet six inches above the ship's deck. H are the slings of the pump, united by a forelock or pin to the end of the brake, and suspending the pump-spear I, by means of the joint-piece g. I K is the pump-spear, made of copper in the upper part, I, and the lower length, K, of iron; the latter has the bucket, M, attached to it. The valve of the bucket is made in a very simple and effective manner, the valve being merely a round plate of brass, with a hole through the centre, to receive the rod, upon which it rises and falls, and covers the aperture in the bucket. The bucket is a ring of brass, with a cross-bar to fix the rod in; it is made in two thicknesses, one above the other, and a cup of leather is held in between them, projecting all round the upper part of the bucket, and turning up, to make a tight fitting in the barrel. The two rings of the bucket are held together by the piston-rod passing through both, and a cross-wedge beneath. L is the brass chamber in which the bucket works; it is well fitted into the wood of the pump-tree, so that the water cannot leak by it, and is bored smooth withinside. N is the lower box, fitted into the lower part of the pump-tree, beneath the chamber; it has a groove round it, into which oakum is placed, and when it is put down, makes a tight joint: its valve is of the same construction as that of the bucket, with the addition of a ring or eye on the top of the pin, on which the valve rises and falls. By this eye the box can be drawn up when it needs repair, by first drawing up the bucket of the pump, and putting an iron hook down into this eye. O O P is the air-vessel; this is a cylinder of sheet copper, soldered to a cover of brass; within the centre of it is a tube, likewise soldered to the cover, through which the copper pump-spear passes, and is fitted round at top with a collar of leather and stuffing. To prevent the escape of the water, it is packed with hemp, and two rings of leather. R shews the place of two iron bars, fitted through the head of the pump, and confining the cover, O O, of the air-vessel; they are fastened by the wedges d: it is by these only that the air-vessel is held down: a circle of leather is first put round the air-vessel, just beneath its lid, and this being pressed upon the recess in the wood, makes the joint tight. T is the pump nozzle, which delivers the water. When it is used as a fire-engine, a hose is fixed on by its link-joints, and keys or wedges: the nozzle is fixed to the pump by four screw-bolts going through the thickness of the pump, and it is fixed in such a direction as will most conveniently lead to a receiver, *fig. 2*, which unites the hoses from all three of the ship's pumps.

Fig. 3. is the link-joint of the hose, T representing the pump-spout made of cast iron, and screwed to the pump-tree; *ee* is the collar or socket, made of brass, with the hose X bound upon it: this has two trunnions, on which a link, *f*, is fitted, one on each side; these links pass through grooves, in the cast-iron piece T, and a key *g*, put down through the link behind it, draws the joint tight, without any screwing or further trouble. The socket, *ee*, is fitted into the nozzle, and has a leather ring to make it tight. The outside of the pump is to be hooped at every three feet, to prevent it from bursting by the pressure of the water. The disposition of the three hand-pumps in a ship's well, renders their connection with a common receiver very convenient to bring all the water into one stream, which will then be very powerful, and more capable of extinguishing a fire than any moveable engine. Two hand-pumps are always placed on the starboard side of the main-mast, in the well, and one of them being the cistern pump used for washing decks, its foot stands in a small cistern fixed upon the step of the main-mast, and supplied with water by a pipe through the ship's side, with a cock to admit it at pleasure; there is one pump on the larboard side of the mast, three separate hoses being

united with each of the pumps by a link-joint, like *fig. 3*, at one end, and with three necks, *k, k, k*, of a receiver, *fig. 2*, by similar joints at the other, brings all the water into one, and a hose being joined by a link-joint, *l*, to the opposite end of the receiver, conveys the whole water to any part of the ship. The receiver has the three nozzles, *k, k, k*, at one end made in a divergent direction, agreeable to the directions in which the hoses came from the three different pumps, and a valve is placed withinside, before each nose, to open inwards, in order that the receiver may be used for one or two pumps, whilst the others are repairing, or getting ready, or that if any of the hoses burst, the water may not escape from the receiver at that nozzle. There are two handles fixed to the receiver, to lift and carry it, as it is to be moveable, and when in use, is proposed to be laid on the grating of the main hatchway, as the most central situation, from which the hose may be carried in any direction. Z is a branch pipe, or jet, screwed at the end of the great hose, X; and it also unscrews at the extreme end, to fit on jets of different bores, in the same manner as all other fire-engines. In working, the pressure of the water condenses the air contained in the receiver, O O P, into a small space, and its reaction to resume its former bulk equalizes the efflux of water from the nozzle of the pump.

In some experiments which we have witnessed upon this pump, it performed as well as could be desired, a single pump forming a very effective engine; but when the three were combined, it was superior in force to any we have ever seen, and would throw a stream, of an inch in diameter, over the main-top-mast head of a 74-gun ship. Besides, the length of the handle, C, admitting several men to work at once, an accession of force is gained by a rope, *n*, made fast to the brake A B, and conducted through a single block, hooked to the deck at *m*, and thence along the ship's deck. At this any number of men may be applied very advantageously, to produce the stroke, leaving those at the handle only to return it by lifting the handle. If the ship proves leaky, and the stuffing-box is thought to be an obstruction to the working of the pump, the air-vessel may be taken out, by drawing the wedges *d*, and taking out the bars R, which confine it; then after taking out the key which connects the joint-piece, *g*, with the copper rod, also removing the brake, lift out the air-vessel by the two screws of the stuffing-box, and fix on the joint piece again, but fix the guide-eye, H, in the lowest pair of holes, so that it will receive the top of the copper rod, and prevent the pump-spear having any play in the slings. In this state it acts as a common hand-pump, but the air-vessel can be restored to its place, and be ready for work in two minutes. To prevent any of the work being neglected from carelessness, the inventor proposes that one of the pumps shall be always used to wash the ship by the hose and jet in the morning, which it would do much more effectively than by the present mode of raising the water into buckets; and the force with which the jet of water is thrown would very completely wash into every recess of the gun carriages, and other places, where a brush cannot reach; while, by this constant exercise the pumps would always be ready at a moment's notice on an alarm of fire.

PUMP, *Air*, in *Pneumatics*, is a machine, by means of which the air is emptied out of vessels, and a sort of vacuum produced in them. For the invention, structure, and use of this pump, see *AIR-pump*; and for Smeaton's improved gage, see *GAGE*.

PUMPS, *Bare*, are small ones made of cane, or a piece of wood bored through, used in lieu of cocks, &c. to pump beer or water out of the casks.

PUMPS, *Bur*, called also *bilge-pumps*, are chiefly used by the Dutch, who have them by their ship's sides. In these is a long staff, with a bur at the end like a gunner's sponge, to pump up the bilge-water.

PUMP-Cisterns, cisterns of wood fixed over the heads of chain-pumps, to receive the water until it is conveyed through the sides of the ship by the pump-*dales*.

PUMP-Dales, a large tube or pipe, generally made of fir, fitted to the cisterns, with a large scupper hole through the side, through which the water is conveyed from the pumps overboard.

PUMP, *Fetching the*. See **FETCHING**.

PUMP, *Rotatory*. See **ROTATORY Pump**.

PUMP, *Spiral*. See **Archimedes' SCREW**, and **SPIRAL**.

PUMPELMOES, a name used by some for a species of orange.

PUMPING at Sea, is usually done by spells, that is, by relieving the men with fresh ones, and counting how many strokes they pump each watch. By this means they know if the ship be staunch, or how her leaks increase.

When all the water is drawn up, and there comes up nothing but wind and froth, they say the *pump sucks*.

PUMPKIN, **CUCURBITA**, in *Botany*. See **CUCURBITA**. The pumpkin is frequently cultivated by the country people in England, who plant them upon their dunghills, where the plants run over them, and spread to a great distance; and when the seasons are favourable, they will produce plenty of large fruit; these they usually allow to grow to maturity, then they cut open a hole on one side, and take the seeds out of the pulp as clean as possible, after which they fill the shells with apples sliced, which they mix with the pulp of the fruit, and some add a little sugar and spice to it; then bake it in an oven, and eat it in the same manner as baked apples; but this is a strong food, and only fit for those who labour hard, and can easily digest it.

For the Method of propagating them, see **CUCURBITA**.

PUMPLITZ, in *Geography*, a town of Switzerland, in the canton of Berne; four miles S. of Berne.

PUN, or **PUNN**, a *lusus verborum*, the wit of which depends on a resemblance between the sounds and syllables of two words, which have different, and, perhaps, contrary significations. See **PARONOMASIA**.

Such are,—*Cane, de cane, cane.*—*Far mole mole mola.*—*Lex Dei, lux diei.*—All houses are turned to ale-houses.—Matrimony is become matter of money.—Some men's paradise is a pair of dice.—Was it so in the time of Noah? Ah no.—*L'ordre tiré du disordre, ou disordre ordonne*, is the title of a French book.

Puns, when they come easily, and are very ingenious, poignant, and apposite, are allowed of in conversation, letters, epigrams, madrigals, and the like compositions; but they are absolutely banished out of the grave, serious, and sublime, because they weaken its force, and diminish its beauty, which consists in something great and elevated. The Greeks and Romans, it is true, sometimes indulged themselves in the practice, and used puns as ornaments in the most serious discourses: but the most severe and philosophical genius of our age, is by no means satisfied with such an outside of wit. Devices, symbols, rebuses, mottoes, &c. are their proper sphere, where they shine to most advantage.

PUNA, in *Geography*, an island in the Pacific ocean, near the W. coast of America, in the bay of Guayaquil, about 60 miles in circuit. The land is flat and low, and on account of its numerous rivers and strong divergent tides, it is encompassed by many dangerous sand-banks. Its capital is Puna, which is situated at the head of the har-

bour, in the N.E. part of the island: it consists of about 50 small houses and a church: the houses are erected upon posts ten or twelve feet high, and ascended by ladders on the outside, on account of the inundation to which the river Guayaquil is subject; they are thatched with palmetto leaves, and their chambers are well boarded. Tradition reports, that the inhabitants formerly amounted to between 12 and 14,000; but at present they do not exceed 300, consisting of Casts and Spaniards, the Indians being very few. The large ships, which cannot lie at Guayaquil, on account of the sand-banks, load and unload here; the anchorage against the middle of the town being very good, with five fathoms of water within a cable's length of the shore. S. lat. 45'. W. long. 79° 46'.

PUNAGRI, in *Hindoo Romance*, is the name of a mythological animal composed of man and bird, on which their god Vishnu is conveyed. Another of its names is *Superna*; which see.

PUNARU, in *Ichthyology*, the name of a small fish of the alauda kind. It has an oblong body, and a thick head, obtuse at the snout. The mouth is small, and in the lower jaw there are only two oblong teeth, which are sharp and pointed like needles. The eyes stand high in the head, the pupil is black, and the iris yellow; and over these there are two short red filaments. The gills are large, and have two oblong fins placed behind them. The back-fin reaches from the head to the tail, and is prickly at the edge. The belly-fin reaches from the anus to the tail. The skin and fins are all brown.

Besides this, there is another species, variegated on its sides with lines of a dusky purple; its jaws beset with very small teeth, and its fins not prickly. Both kinds are found among the rocks about Brasil, and sometimes get into the shells of the larger shell-fish. Marggrave Hist. of Brasil.

PUNAY, in *Ornithology*, a name given by the people of the Philippine islands to a very beautiful species of turtle, common in their woods.

It is of the size of a small parrot, and is of a fine green colour, but the extreme feathers of its wings are tipped with white, and the lower part of its belly is of a saffron colour. Its beak is yellow.

PUNCATEEAH, in *Geography*, a river of Bengal, which runs into the Hooringottah. N. lat. 22° 4'. E. long. 90°.

PUNCH, an instrument of iron or steel, used in several arts, for the piercing and stamping of holes in plates of metals, &c. being so contrived, as not only to perforate but to cut out and take away the piece; whence the French call it, *emporte-pièce*, *q. d.* take-off piece.

The punch is a principal instrument of the metal-button-makers, wafer-makers, patch-makers, shoe-makers, &c. The punch of the makers of plate-buttons serves to cut and parcel out the plates of gold and silver with which they cover their moulds. It is large, round, four or five inches high, the bottom hollow for about half an inch, well fleeced, and the edge very sharp.

To use it, they extend the plate of metal on a leaden table or block, and with a pretty heavy hammer strike the head of the punch, &c. See **BUTTON-making**.

PUNCH Horse, in the *Manege*, is a well-set, well-knit horse, short-backed and thick-shouldered, with a broad neck, and well lined with flesh. Thus, we have the Suffolk punch horse, &c.

PUNCH is also a name of a sort of compound drink, frequent in England, and particularly about the maritime parts of the country.

Its basis is spring water, which being rendered cooler, brisker, and more acid, with lemon-juice, and sweetened again to the palate with fine sugar, makes what they call *sherbet*; to which a proper quantity of a spirituous liquor, as brandy, rum, or arrack, being superadded, the liquor becomes *punch*.

Several authors condemn the use of punch, as prejudicial to the brain, and nervous system. Dr. Cheyne insists, that there is but one wholesome ingredient in it; *viz.* the mere water.

The proportions of the ingredients are various. Some, instead of lemon-juice, use lime-juice, which makes what they call *punch-royal*; this is found less liable to affect the head, as well as more grateful to the stomach.

Some also make milk-punch, by adding nearly as much milk to the sherbet as there is water, which tempers the acrimony of the lemon. Others prefer tea-punch, made of green tea instead of water, and drank hot.

Lastly, What they call punch for chamber-maids, is made without any water, of lime-juice, sharpened with a little orange and lemon-juice; twice as much white wine as lime-juice, and four times as much brandy, with sugar.

PUNCHEEE, in *Geography*, a town of Morung; 75 miles E. of Amerpour.

PUNCHEON. See PUNCHION.

PUNCHIN, or PUNCHION, in *Building*. See PUNCHION.

PUNCHION, or PUNCHEON, a little block or piece of steel, on one end of which is some figure, letter, or mark, engraven either in creux, or in relievō; impressions of which are taken in metal, or some other matter, by striking it with a hammer.

There are various kinds of these punchions used in the mechanical arts. Such, for instance, are those of the goldsmiths, cutlers, pewterers, &c.

PUNCHION, in *Coining*, is a piece of iron steeled, on which the engraver has cut, in relievō, the several figures, arms, effigy, inscription, &c. that are to be in the matrices with which the species are to be marked.

Minters distinguish three kinds of punchions, according to the three kinds of matrices to be made; that of the effigy, that of the cross or arms, and that of the legend or inscription.

The first includes the whole portrait in relievō. The second are small, each only containing a piece of the cross or arms, *v. gr.* a fleur-de-lys, a harp, a coronet, &c. by the assemblage of all which the entire matrix is formed. The punchions of the legend only contain each one letter, and serve equally for the legend on the effigy-side, and the cross-side. See COINING.

For the manner of engraving, tempering, and stamping, these punchions, to form the matrices, see ENGRAVING on steel, MATRICE, &c.

PUNCHIONS, in *Printing*, are those used in stamping the matrices, in which the types of printing characters are cast. See LETTER FOUNDERY.

PUNCHION is also used for several iron tools of various sizes and figures, used by the engravers in creux on metals. Seal-gravers particularly use a great number, for the several pieces of arms, &c. to be engraven; and many stamp the whole seal from a single punchion.

PUNCHION is also a common name for all the iron instruments used by the stone cutters, sculptors, locksmiths, &c. for the cutting, incising, or piercing their several matters.

Those of sculptors and statuaries serve for the repairing statues, when they are taken out of the moulds.

The locksmiths use the greatest variety of punchions;

some for piercing hot, others for piercing cold; some flat, some square, some round, others oval; each to pierce holes of its respective figure in several parts of locks.

PUNCHION, or *Punchin*, in *Carpentry*, is a piece of timber placed upright between two posts, whose bearing is too great, serving together with them to sustain some large weight.

The punchion is usually lower and slighter than either prick-posts or principal posts, and is joined by a brace, or the like, of iron. See POST. Those on each side of a door, are called *door punchions*.

PUNCHION is also a piece of timber raised upright under the ridge of a building, in which the little forces, &c. are jointed. Vitruvius calls the punchion *columnen*.

PUNCHION is also used for the arbor or principal part of a machine, on which it turns vertically; as that of a crane, &c.

PUNCHION is also a measure for liquids, containing a hoghead and a third, or 84 gallons, or one-third of a tun.

The Paris punchion is the same with their demiqueue; at Rouen it is three bushels, &c. See MEASURE.

PUNCRACK, in *Geography*, a town of Hindoostan, in Bahar; 22 miles N.E. of Bahar.

PUNCTA LACRYMALIA, in *Anatomy*, the two small round openings at the inner ends of the eye-lids, by which the lacrymal canals, conveying the tears to the lacrymal bag from the surface of the eye, begin. They are distinguished by the epithets *superius* and *inferius*. See EYE.

PUNCTATED HYPERBOLA, in the *Higher Geometry*, an hyperbola whose oval conjugate is infinitely small, *i. e.* a point.

PUNCTICULARIS FEBRIS, in *Medicine*, a name given by some authors to fever, when accompanied with an eruption of purple spots, or *petechiæ*; these spots being sometimes called *puncticula*. See PETECHIÆ.

PUNCTION, or PUNCTURE, in *Surgery*, an aperture made in the lower belly, in dropical persons, to discharge the water, called also *paracentesis*.

PUNCTUATION, in *Grammar*, the art of pointing; or dividing a discourse into periods, and members of periods, by points expressing the pauses to be made in the reading of it; and necessary both for understanding and pronouncing it.

The points that are used are four; *viz.* the *period*, *colon*, *semicolon*, and *comma*. See the particular use of each under its proper article.

Punctuation is a modern art; the ancients were entirely unacquainted with the use of our commas, colons, &c. and wrote not only without any distinction of members and periods, but also without distinction of words; which custom, Lipsius observes, continued till the 104th Olympiad; during which time the sense alone divided the discourse.

The antiquity of pointing, however, has had its advocates; some have ascribed the invention of it to Thrasymachus, who was contemporary with Plato; others to Isocrates, who flourished about the same time; and others to Nicanor, in the time of Adrian. A late writer observes, that pointing was not unknown in the time of Alexander the Great. Aloysii Antonii Verneii, &c. de Orthog. Lat. Rom. 1747.

Cicero's expressions, *verborum et sententiarum interpunctas clausulas in orationibus*, lib. iii. de Orat. and *clausulus atque interpuncta verborum*, &c. in his Orat. pro Muræna, have been alleged by some as evidences of the antiquity of this practice; but others have referred the former words to speaking, and not to writing; the latter, to those points which were formerly placed after each word, in order to distinguish

tinguish word from word, when the whole was written in large capitals, at equal distances from one another; which is a very different thing from that sort of punctuation which divides the sense and subject matter into members and sentences, and parts of sentences, in such proportions as either the sense or the construction may require. The words of Seneca in his 40th Ep. *Nos etiam cum scribimus interpungere solemus*, are more applicable to this latter sort of pointing than those of Cicero; and yet these have been understood to refer to the distinctions of words. See an Essay on the Use of Pointing, by Sir James Burrow, F.R.S. and F.A.S. 4to. p. 6.

There is much more difficulty in pointing than people are generally aware of. In effect, there is scarcely any thing in the province of the grammarian so little fixed and ascertained as this. The rules usually laid down are impertinent, dark, and deficient; and the practice, at present, is perfectly capricious, authors varying not only from one another, but from themselves too.

Dr. Lowth observes, that few precise rules can be given which will hold without exception, in all cases; they must be laid down with as much exactness as the nature of the subject will admit; and they may serve for a general direction, to be accommodated to different occasions, and to be supplied, when deficient, by the taste and judgment of the writer. *Introd. to Eng. Gram. Ed. 1772, p. 194.*

Indeed, F. Buffier, and since him Dr. Ward, and bishop Lowth, have done something towards a fixed and precise system of pointing, from the reason and analogy of things. Their doctrine the reader will find under the articles COMMA, COLON, SENTENCE, &c.

In the general, we shall only here observe, that the comma is to distinguish nouns from nouns, verbs from verbs, and such other parts of a period as are not necessarily joined together. The semicolon serves to suspend and sustain the period when too long; the colon, to add some new, super-numerary reason, or consequence, to what is already said; and the period, to close the sense and construction, and to release the voice. For the proportional quantity, or time of the points, with respect to one another, see COMMA.

PUNCTUM, in *Geometry*, &c. See POINT. In the schools they have their

PUNCTUM *Terminans*, which is the indivisible extreme of a line, beyond which no part of the line extends.

PUNCTUM *Continuans*, an indivisible magnitude between contiguous points of a line, by which they are connected, and from whence arises a continuity.

PUNCTUM *Initians*, an indivisible point, from which the line begins.

PUNCTUM *Formatum*, or *Generatum*, in *Conics*, is a point determined by the intersection of a right line drawn through the vertex of a cone to a point in the plane of the base that constitutes the conic section.

PUNCTUM *ex comparatione* denotes either of the foci of an ellipsis and hyperbola; thus called by Apollonius, because the rectangles under the segment of the transverse diameter in the ellipsis, and under that and the distance between the vertex and the focus in the hyperbola, are equal to one fourth part of what he calls the *figure* of it.

PUNCTUM *Lineans*, in *Geometry*, is a term used by some authors for that point of the generating circle of a cycloid, or epicycloid, which in the genesis produces any part of the cycloidal line.

PUNCTUM *Saliens*, in *Anatomy*, the heart of the incubated chicken, at the time when it first displays motion. See INCUBATION.

PUNCTUM *Aureum*, an old mode of operating with a view

of accomplishing the radical cure of hernia, or ruptures. An incision was made down to the neck of the hernial sac, under which a golden wire was drawn and tightened, after the bowels had been reduced. The dangerous consequences which have occasionally followed this method, and particularly its insufficiency to protect the patient from a future descent of the bowels, are the reasons which have led the generality of modern practitioners to abandon the practice altogether.

PUNCTURE, PUNCTURA, in *Surgery*, &c. any wound made by a pointed instrument.

PUNCTURED WOUNDS. See WOUNDS.

PUND-BRECH, or POUND-BREACH, compounded of the Saxon, *pund*, *pound*, and *brech*, *fracture*, *breaking*, denotes the illegal taking of cattle out of the pound; either by breaking the pound, picking the lock, or otherwise.

“Si pund-brech fiat in curia regis, plena wyta fit: alibi quinquin manæ.” *Leg. Hen. I.* See POUND.

PUNDFULDA, a pound for cattle, or pinfold. “Placita inter abbat.” *Glaston. et Hen. de Hamel, anno 1236.*

PUNDIPOUR, in *Geography*, a town of Hindoostan, in Oude; 20 miles S.S.W. of Fyzabad.

PUNDIT, in the *History of Eastern Literature*, the name given to the interpreter of the Hindu law.

PUNDNA, in *Geography*, a town of Affam; 20 miles W. of Gentiah.

PUNGANORE, a town of Hindoostan, in Myfore; 60 miles W.N.W. of Arcot. N. lat. 13° 12'. E. long. 78° 32'.

PUNGITIUS, in *Ichthyology*, the ten-spined stickleback of the British Zoology, a species of *Gasterosteus*; which see.

PUNGNAN, in *Geography*, a town of Meckley; 58 miles W. of Munnypour.

PUNGO ISLANDS, a cluster of small islands, at the mouth of the river Gabon, near the coast of Benin; the principal island being about six miles in circumference and governed by a king.

PUNHETE, a town of Portugal, in Estramadura, at the conflux of the Zezere with the Tagus; 8 miles W.N.W. of Abrantes.

PUNICA, in *Botany*, *malum punicum* of the ancients, so called, as it is presumed, because the Romans obtained this fruit from the north of Africa. Sometimes it was called *malum granatum*, in allusion to its internal granulations; whence the English name, Pomegranate.—*Linn. Gen. 248. Schreb. 335. Willd. Sp. Pl. v. 2. 981. Mart. Mill. Dict. v. 3. Ait. Hort. Kew. v. 3. 194. Sm. Prodr. Fl. Græc. Sibth. v. 1. 336. Juss. 325. Tourn. t. 407. Lamarck Illustr. t. 415. Gærtn. t. 38.—Class and order, Icosandria Monogynia. Nat. Ord. Pomaceæ, Linn. Myrti, Juss.*

Gen. Ch. Cal. Perianth superior, of one leaf, bell-shaped, coloured, permanent, in five acute segments. Cor. Petals five, roundish, rather spreading, inserted into the calyx. Stam. Filaments numerous, capillary, inserted into the tube of the calyx, without any order, and shorter than its segments; anthers oblong. Pist. Germen inferior, roundish; style simple, the length of the stamens; stigma capitate. Peric. Apple nearly globose, large, crowned with the calyx, separated into two internal divisions by a transverse partition, the uppermost of them subdivided into about nine cells, the lowermost into about three, with membranous partitions. Seeds very numerous, angular, each with a pulpy coat. Receptacle fleshy, pitted, dividing each cell into two parts.

Ess. Ch. Calyx superior, in five segments. Petals five. Apple with many cells. Seeds numerous, pulpy.

1. P. *Granatum*. Common Pomegranate Tree. *Linn. Sp.*

Sp. Pl. 676. Willd. n. 1. Ait. n. 1. Sm. Fl. Græc. Sibth. t. 476, unpublished. Trew Ehret. 36. t. 71, 72. Mill. Illustr. t. 41. Woodv. Med. Bot. t. 58. Andr. Repof. t. 96, with white flowers. (*Malus granata*; Ger. Em. 1450.)—Leaves lanceolate. Stem arboreous.—Native of the south of Europe and north of Africa. Dr. Sibthorp found it plentiful in Greece, both wild and cultivated. The inhabitants know it by its ancient name *ῥόζον*. This tree is one of the oldest exotics in our gardens, but scarcely perfects its fruit, except, now and then, against a warm wall. The beautiful blossoms are produced from June to September, and in a double state are particularly admired and valued. The leaves are opposite or ternate, sessile, wavy, entire, of a fine green, deciduous. *Flowers* sessile. *Calyx* thick and coriaceous. *Petals* membranous and wavy. *Fruit* as big as an orange, of a tawny brown, with a thick astringent coat, containing abundance of seeds, each enveloped in a distinct, very juicy, crimson coat, whose flavour, in a wild state, is a pure very strong acid, but in the cultivated plant sweet and highly grateful.

2. *P. nana*. Dwarf Pomegranate Tree. Linn. Sp. Pl. 676. Curt. Mag. t. 634.—Leaves linear. Stem shrubby.—Native of the West Indies. Said to have been cultivated in Sherard's garden at Eltham in 1723. At present it is a rare green-house shrub, of humble size, flowering in summer, and having all the appearance of a dwarf variety of the foregoing.

PUNICA, in *Gardening*, contains plants of the tree and shrub kinds, of which the species cultivated are, the common pomegranate (*P. granatum*); and the dwarf pomegranate (*P. nana*).

Of the first there are several varieties; as the large double-flowered, and the striped-flowered.

Method of Culture.—The first sort and varieties are readily increased by layers, which should be laid in autumn, chusing the young branches for the purpose, giving a little slit underneath at a bud, and laying them in the usual way, giving occasional waterings in summer; and by the following autumn they will be well rooted, and fit to be planted in nursery-rows for two or three years, to get strength, and then planted where they are to remain.

Those of the common sort and varieties may be trained as half or full standards, or as dwarfs; but those designed for walls should be managed as directed for peaches, &c. This sort may be planted against warm walls, and be pruned and trained as other fruit-trees.

Of this sort, the double-flowering kind is much more esteemed than the other in this country, for the sake of its large, fine, double flowers, which are of a most beautiful scarlet colour; and, if the trees are supplied with due nourishment, continue to produce flowers for two months successively; which renders it one of the most valuable flower-

ing trees. This sort may be rendered more productive of flowers by grafting it upon stocks of the single kind, which check the luxuriance of the trees, and cause them to produce flowers upon almost every shoot.

The second sort may be raised also by layers, as the former, but must be planted in pots filled with rich earth, and preserved in a green-house. In the summer, when the flowers begin to appear, if the plants are exposed to the open air, the buds will fall off without opening; they should therefore be placed in an airy glass case, and a large share of air should be given them every day in warm weather. By this treatment the plants may be continued in flower upwards of three months, and make a fine appearance.

These are very ornamental trees for shrubberies and other places.

PUNICUS LAPIS, in *Natural History*, a name given by the writers of the middle ages to a stone of a spongy texture, the powder of which was good in diseases of the eyes.

This seems to have been no other than the pumice, the writers of these times having been strangely incorrect in their orthography; and all the virtues ascribed to this stone, as also the places where it was found, which are the Æolian islands, &c. seeming to have been copied from Pliny's account of the pumice.

PUNIE, in *Geography*, a town of Lithuania, in the palatinate of Troki; 5 miles N. of Olita.

PUNJE, a town of Hindoostan, in the circle of Ellichpour; 5 miles E. of Akoat.

PUNJEREE, a town of Hindoostan, in Bahar; 20 miles N.W. of Palamow.

PUNJGOOR, or *PUNGER*, the name of a small but fertile district of Persia, lying about ten days' journey N.N.E. from Kej, the capital or chief town of all Mekran. It is celebrated for the quality and quantity of the dates it produces, and contains 13 well-peopled villages, all of which are abundantly supplied with water from the bed of the river Burdoo, a few miles N. of them. These villages, two of which are larger and more respectable than the others, are governed by an independent chief. Punjgoor is 15 days' journey from Kelat, by the route of Khozelar, and at the same distance from Nooshley by that of Kharan. It is spoken of as a very mountainous tract, producing in some of its villages grain, sufficient for the consumption of the few wandering shepherds who inhabit them. The people are rather a small delicate race; their arms are a match-lock, sword and shield, and each village has its own chief, who settles the disputes which occur among the inhabitants. This district has plenty of water, except in the months of April, May, and June, when it becomes scarce; it produces dates, and furnishes camels, sheep, and goats, but not in great numbers.

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